US009271603B2

(12) **United States Patent**
**Yui et al.**

(10) **Patent No.: US 9,271,603 B2**
(45) **Date of Patent: Mar. 1, 2016**

(54) **BOTTLED WATER DISPENSERS WITH SINGLE-SERVE COFFEE BREWING FEATURES**

(71) Applicants: **George M. Yui**, Toronto (CA); **Andrei Yui**, Toronto (CA); **Wang Qiubo**, Toronto (CA)

(72) Inventors: **George M. Yui**, Toronto (CA); **Andrei Yui**, Toronto (CA); **Wang Qiubo**, Toronto (CA)

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 213 days.

(21) Appl. No.: **14/011,689**

(22) Filed: **Aug. 27, 2013**

(65) **Prior Publication Data**

US 2014/0238245 A1 Aug. 28, 2014

**Related U.S. Application Data**

(63) Continuation of application No. 13/751,996, filed on Jan. 28, 2013, now abandoned.

(51) **Int. Cl.**

| | |
|---|---|
| ***A47J 31/00*** | (2006.01) |
| ***A47J 31/46*** | (2006.01) |
| ***A47J 31/40*** | (2006.01) |
| ***B67D 3/00*** | (2006.01) |
| ***A47J 31/36*** | (2006.01) |

(52) **U.S. Cl.**

CPC ..... ***A47J 31/465*** (2013.01); ***A47J 31/3628*** (2013.01); ***A47J 31/3695*** (2013.01); ***A47J 31/407*** (2013.01); ***B67D 3/0009*** (2013.01); ***B67D 3/0019*** (2013.01)

(58) **Field of Classification Search**

CPC ..... A47J 31/3695; A47J 31/3628; B67D 3/0009; B67D 3/0019

USPC ..... 99/290, 275, 279, 295, 323.3; 222/146.1, 146.2, 146.6, 639, 640, 222/383.1

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

| | | | | |
|---|---|---|---|---|
| 3,345,934 | A * | 10/1967 | Steiner | A47J 31/50 222/146.1 |
| 5,816,135 | A * | 10/1998 | Ferri | A47J 31/06 222/146.2 |
| 6,053,092 | A * | 4/2000 | Anderson | A47J 31/44 222/383.1 |
| 6,073,539 | A * | 6/2000 | Triola | B67D 3/00 222/146.1 |
| 8,276,787 | B1 * | 10/2012 | Gremillion | B67D 1/0004 222/129.1 |
| 2005/0188855 | A1 * | 9/2005 | Tang | A47J 31/106 99/279 |
| 2007/0000949 | A1 * | 1/2007 | Bosi | B67D 3/00 222/312 |

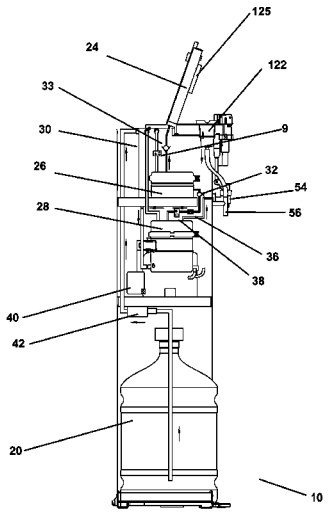
* cited by examiner

*Primary Examiner* — Reginald L Alexander

(57) **ABSTRACT**

Combined water dispensers and coffee making devices are disclosed, which include a cabinet configured to house a water bottle in a bottom half of the interior portion of the cabinet; a cold tank that is configured to receive water from the water bottle, which is connected to an evaporator; one or more hot tanks that are configured to receive water (directly or indirectly) from the cold tank, which are connected to a heating coil to heat the water that is contained therein; and a coffee making device located on a top side of the cabinet. The coffee making device receives water from the hot tank, receives a disposable cartridge that contains coffee grinds for a single-serving of coffee, causes water to contact the coffee grinds to produce a coffee beverage, and employs a set of spikes to make water entry and exit apertures in the cartridge.

**20 Claims, 47 Drawing Sheets**



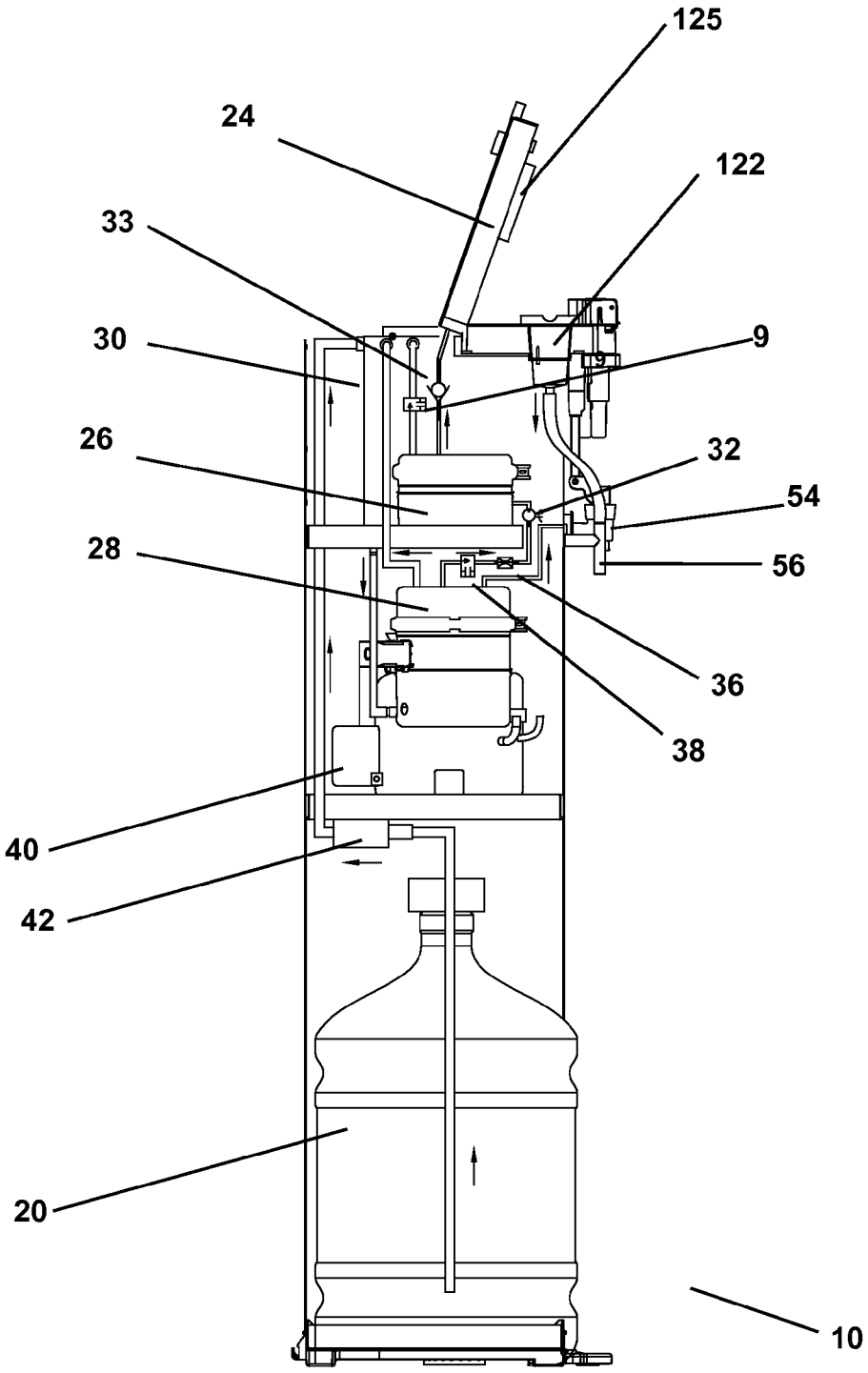



Figure 1

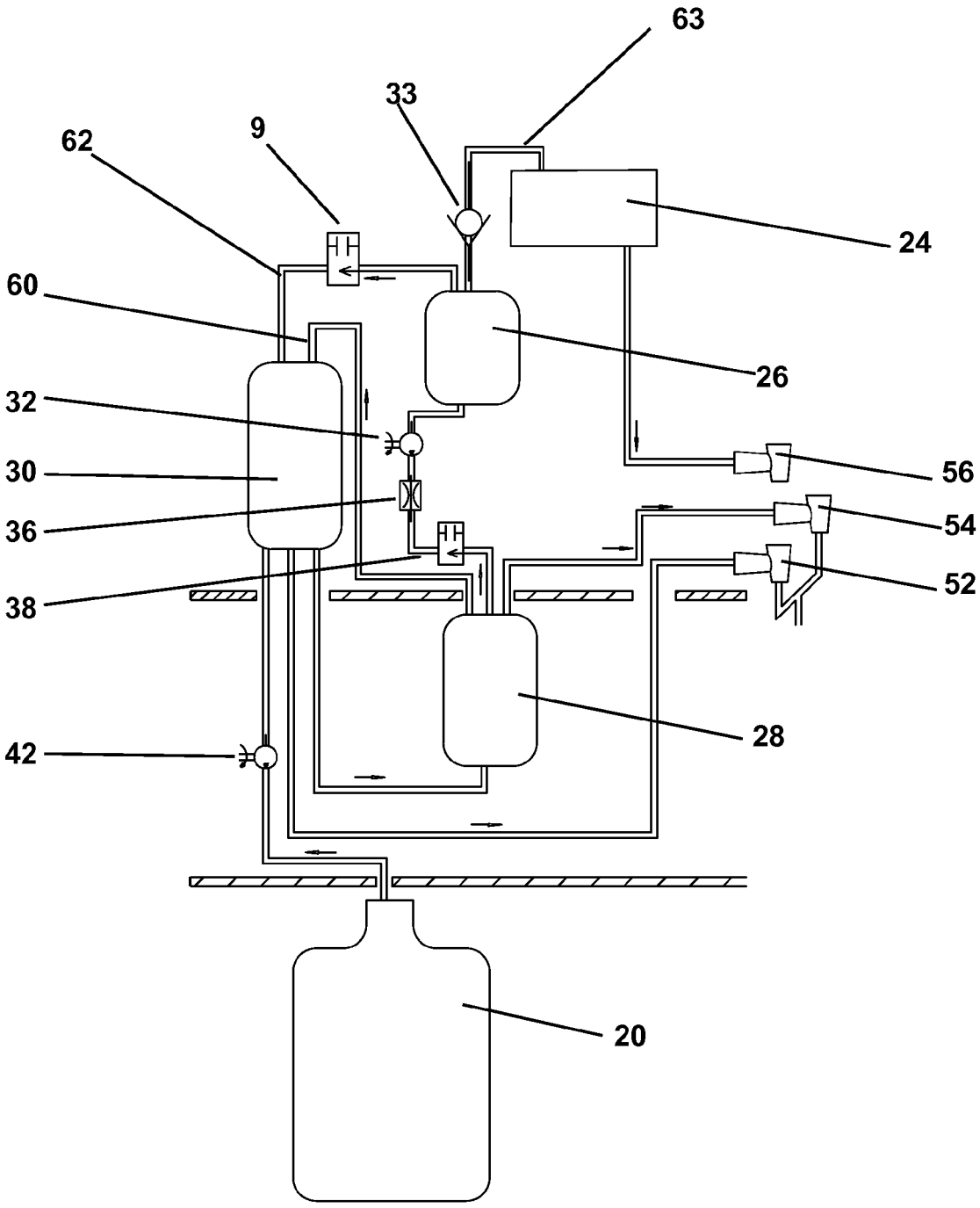



Figure 2

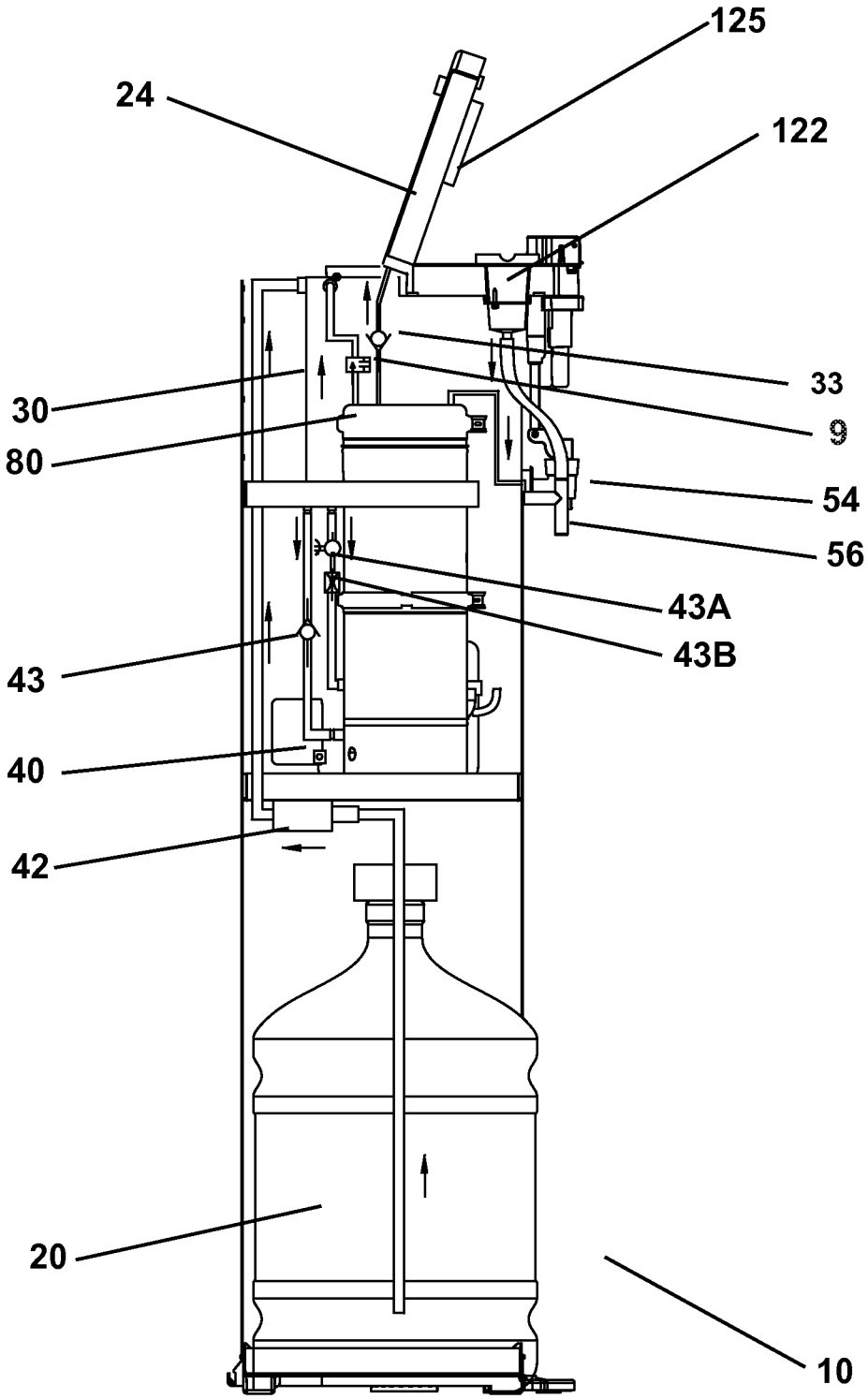



Figure 3

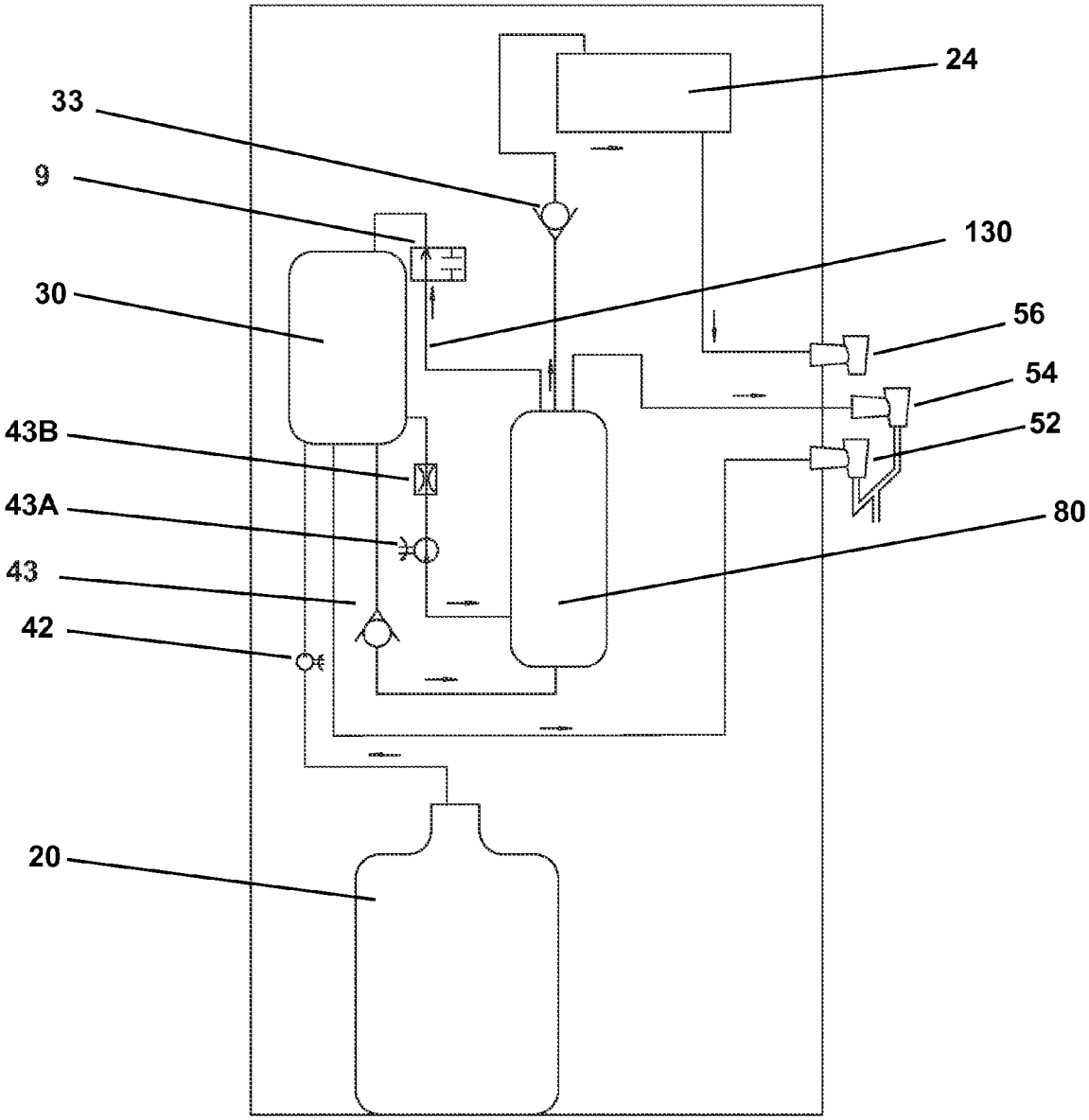



Figure 4

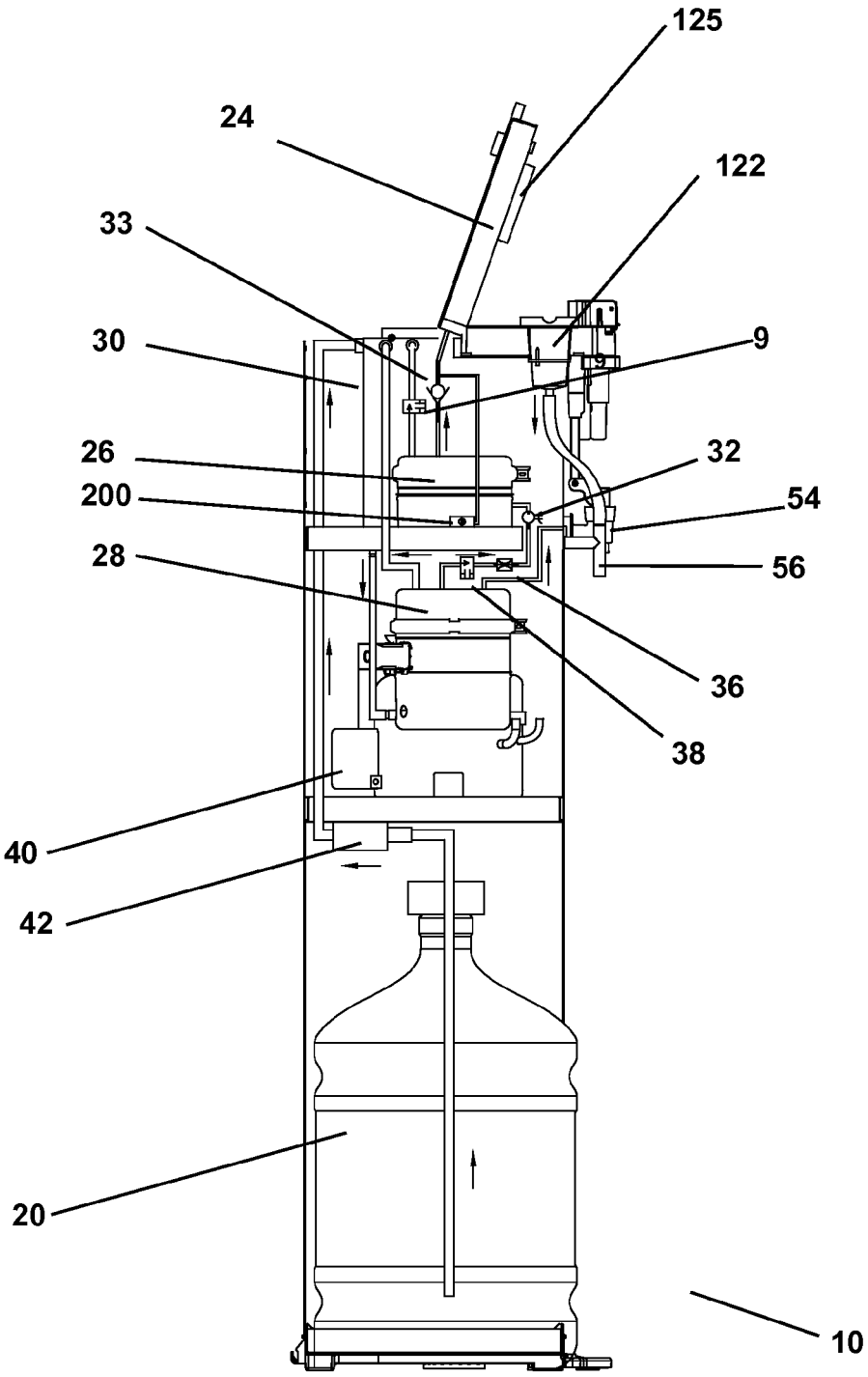



Figure 5

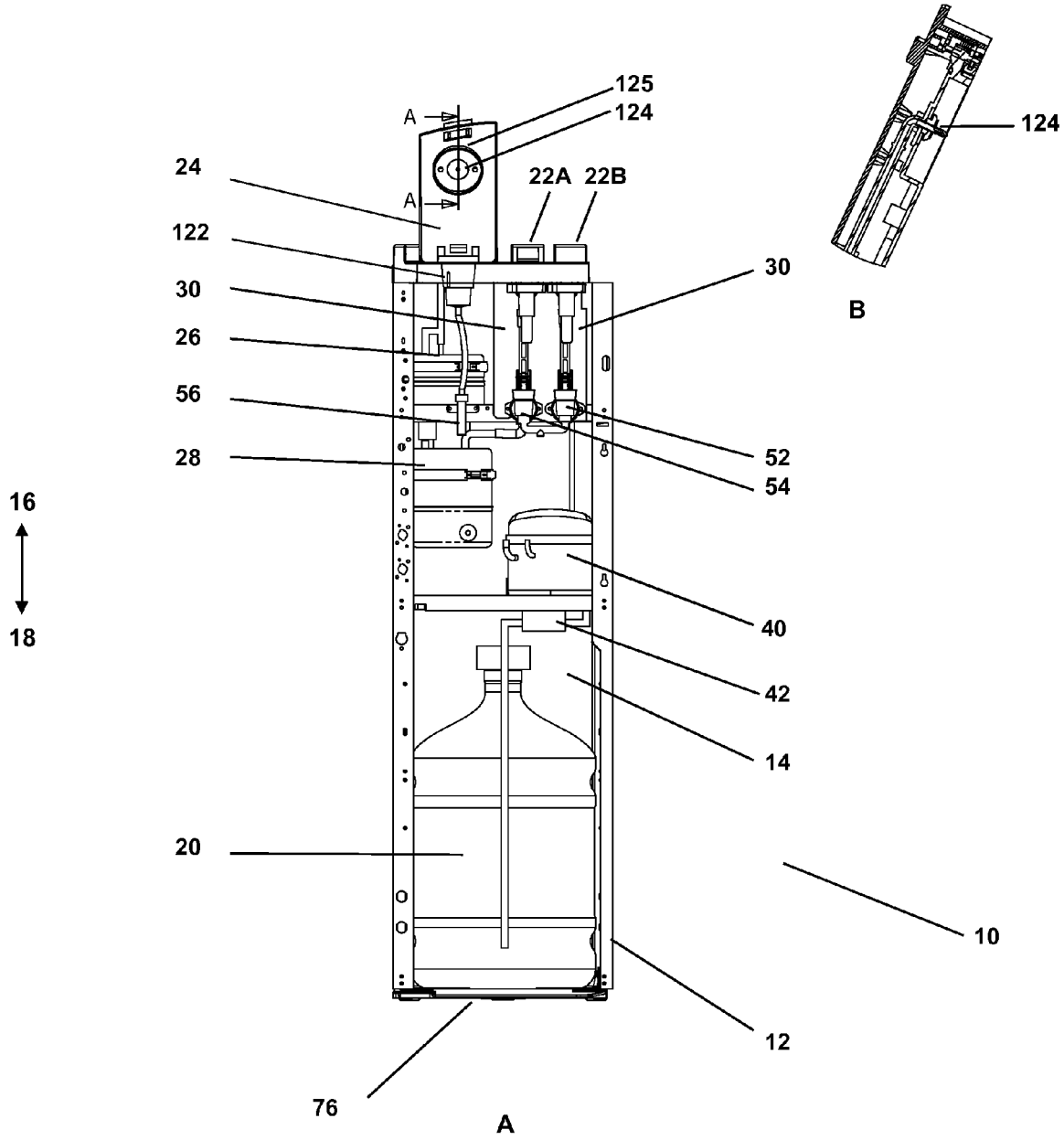

125
124
A
A
24
22A
22B
122
30
26
56
28
16
18
52
54
40
42
14
20
10
12
76
A
124
30
B

Figure 6

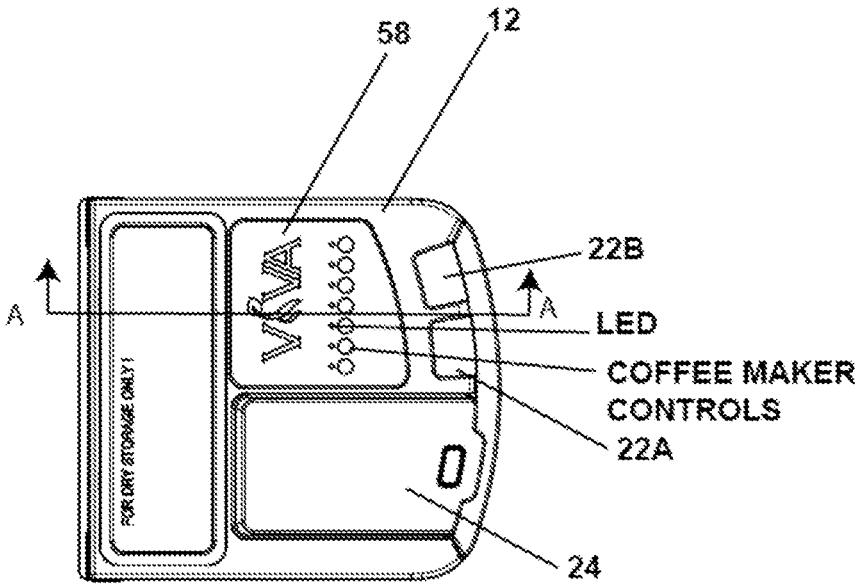



Figure 7

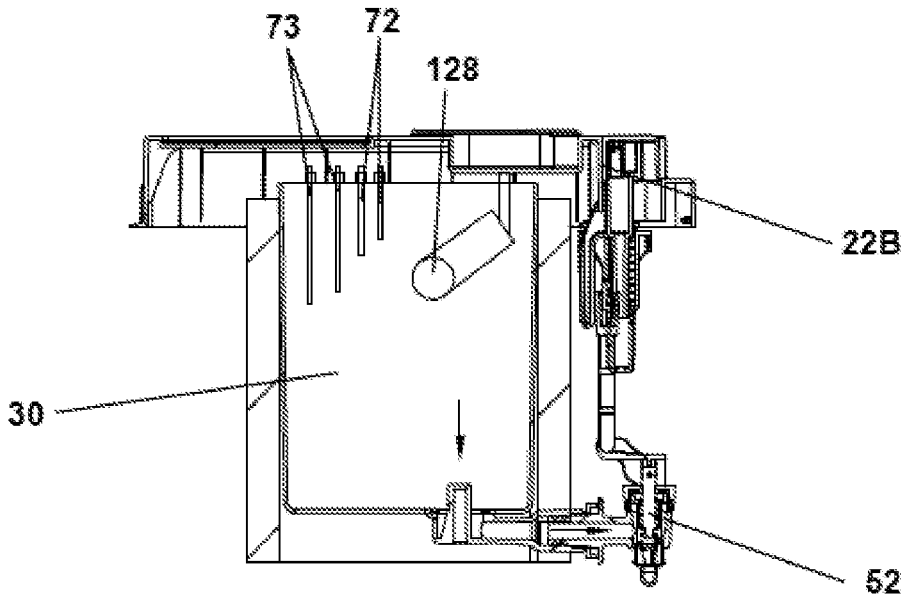



Figure 8

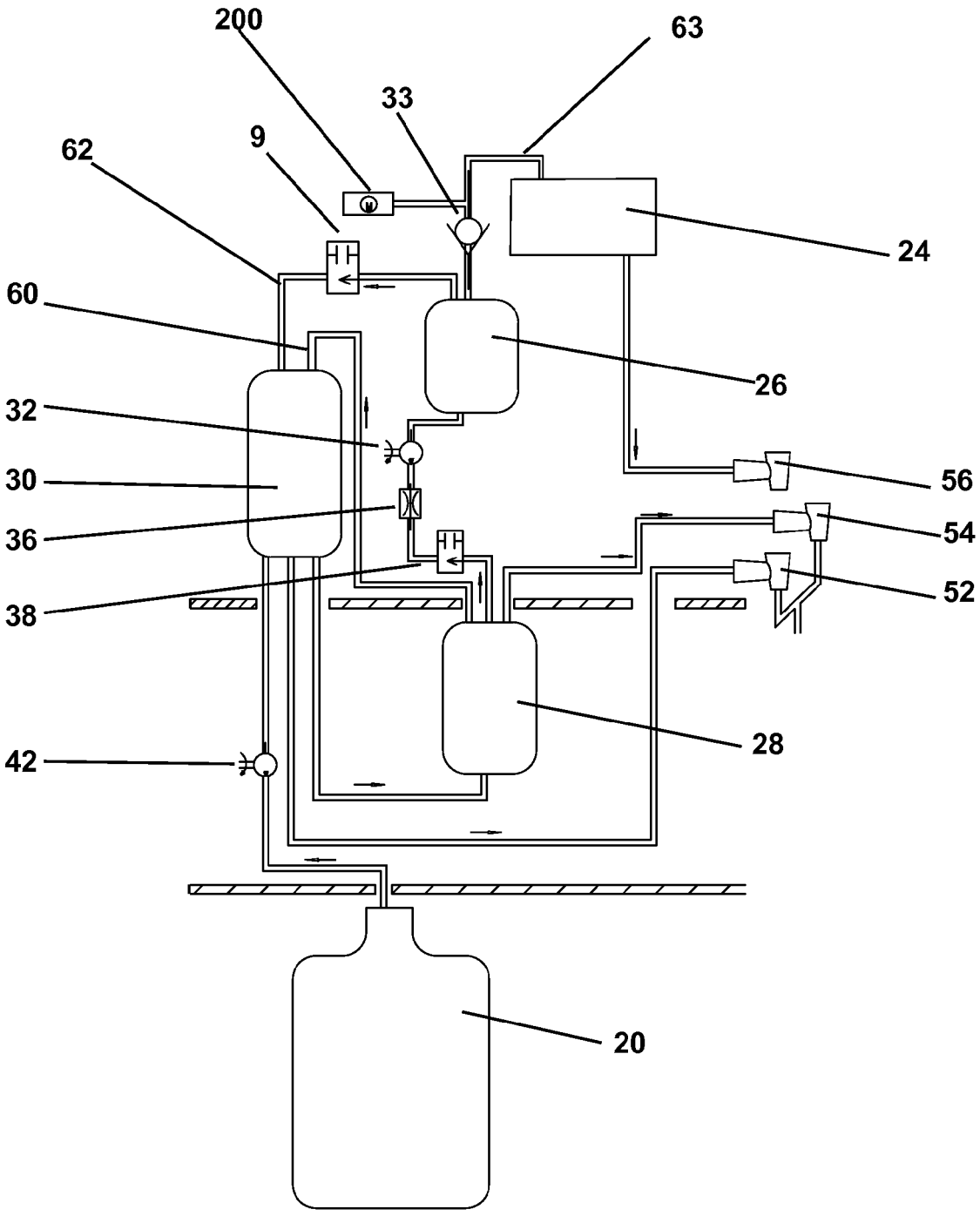



Figure 9

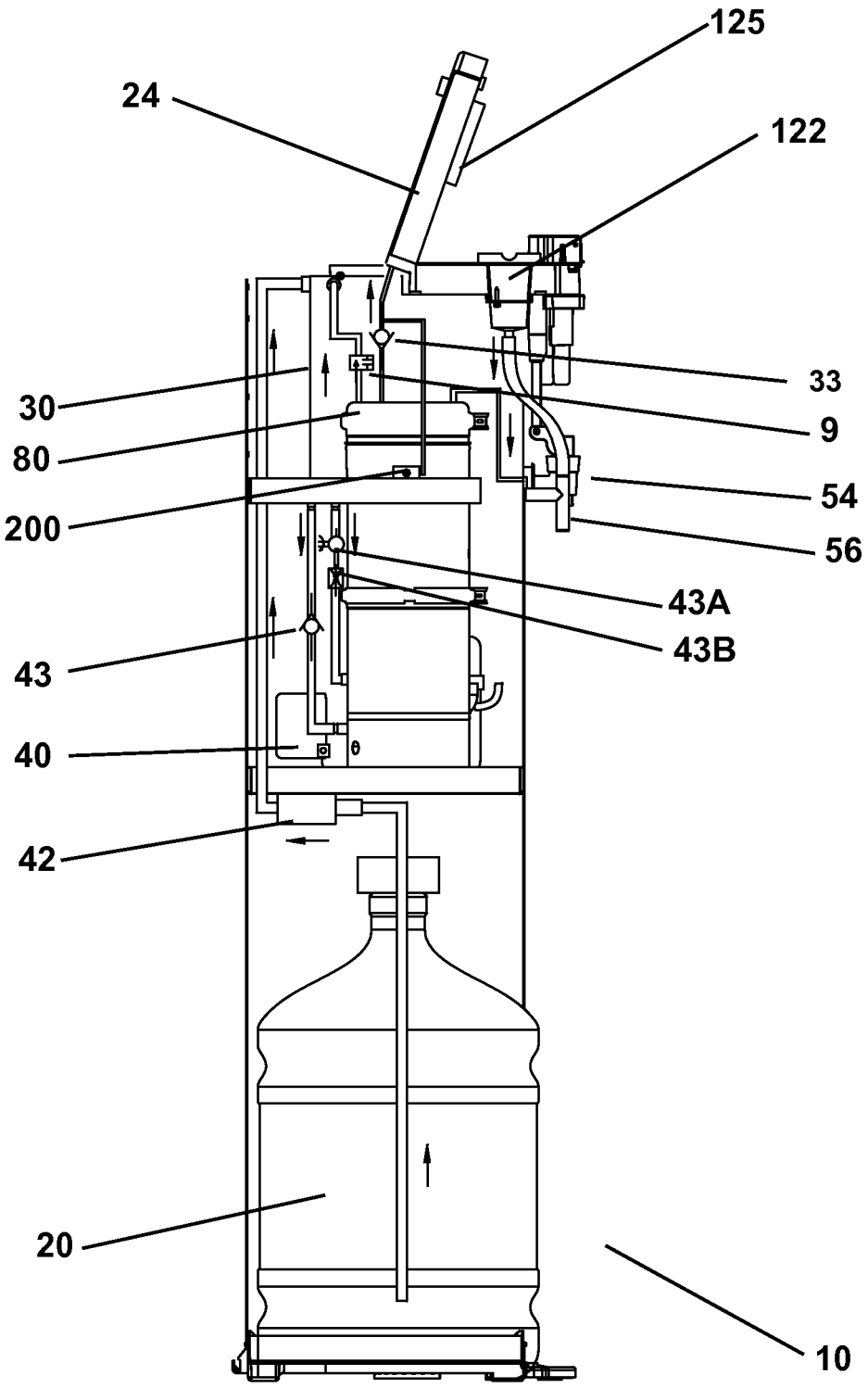



Figure 10

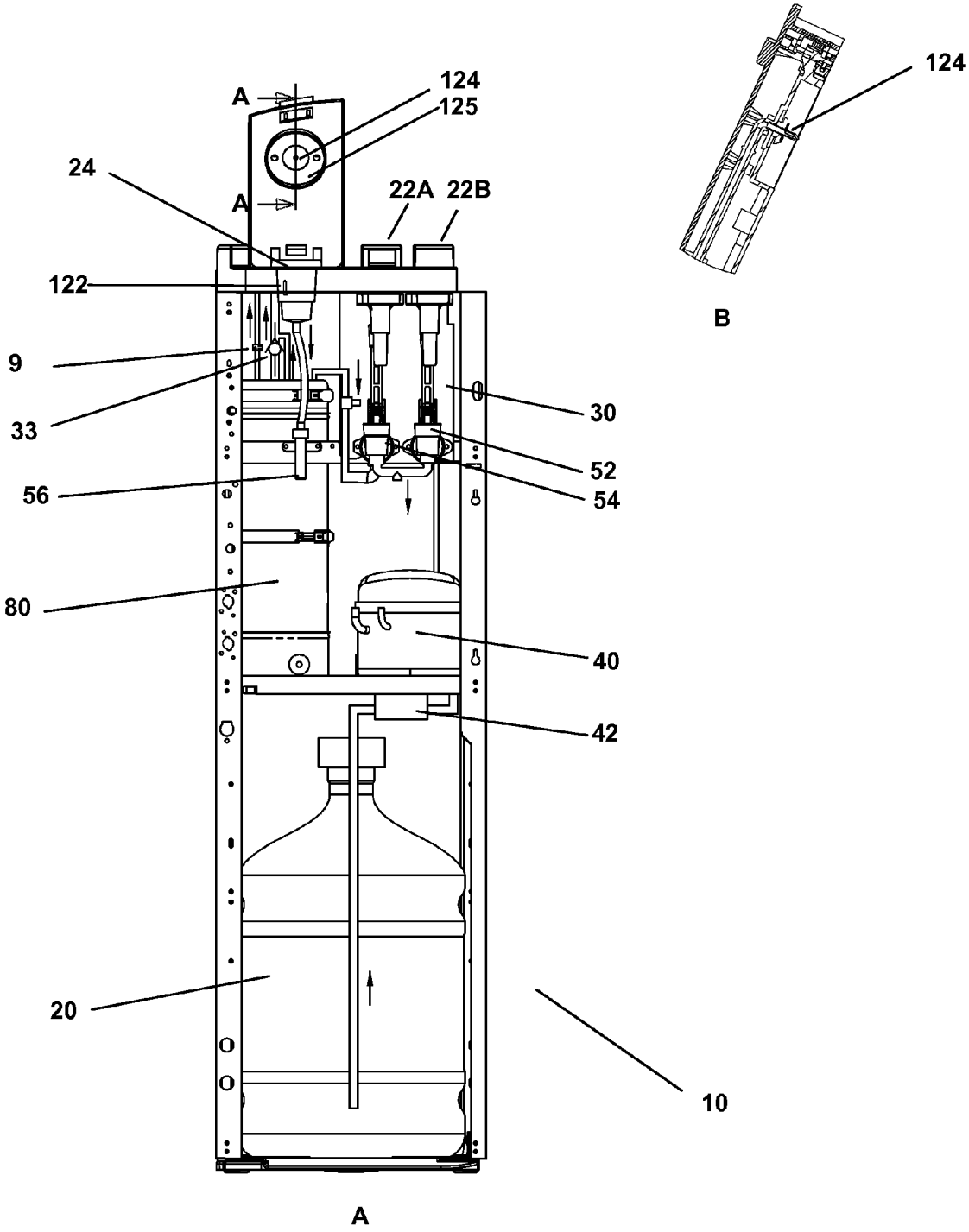



Figure 11

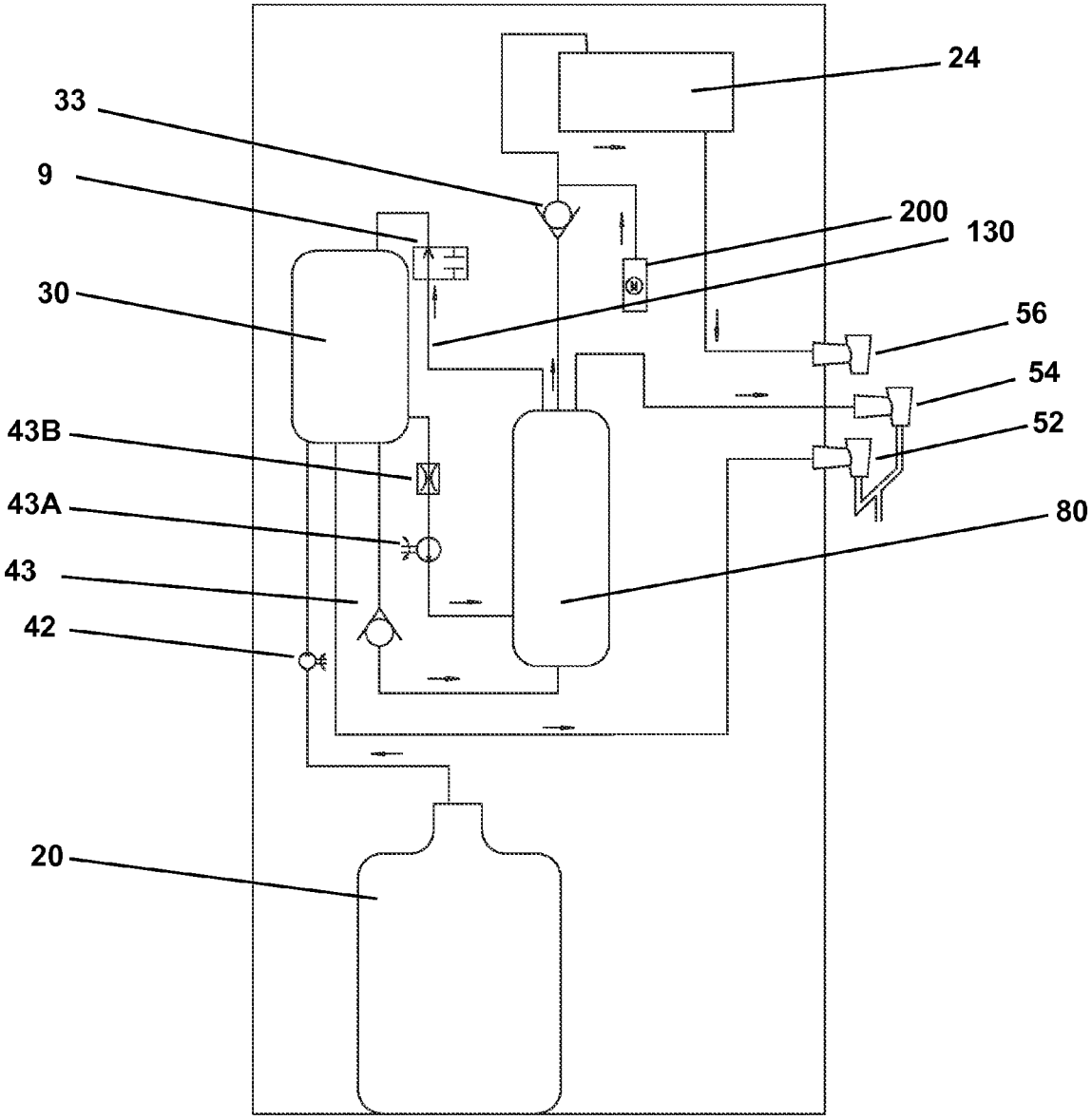



Figure 12

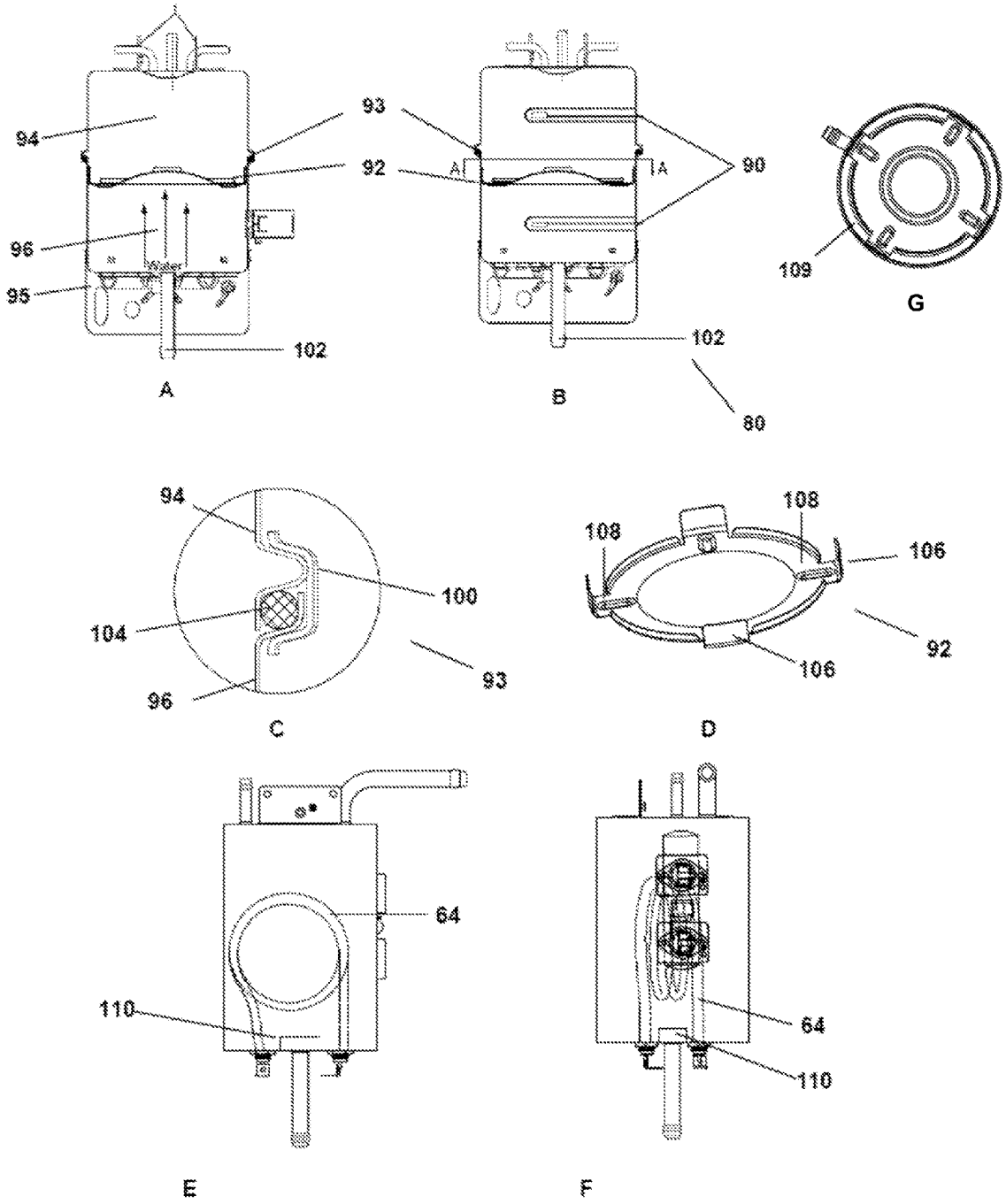

94
93
92
96
95
102
A
A
A
90
102
80
B
109
G
94
100
104
93
96
C
108
108
106
92
106
D
64
110
E
64
110
F

Figure 13

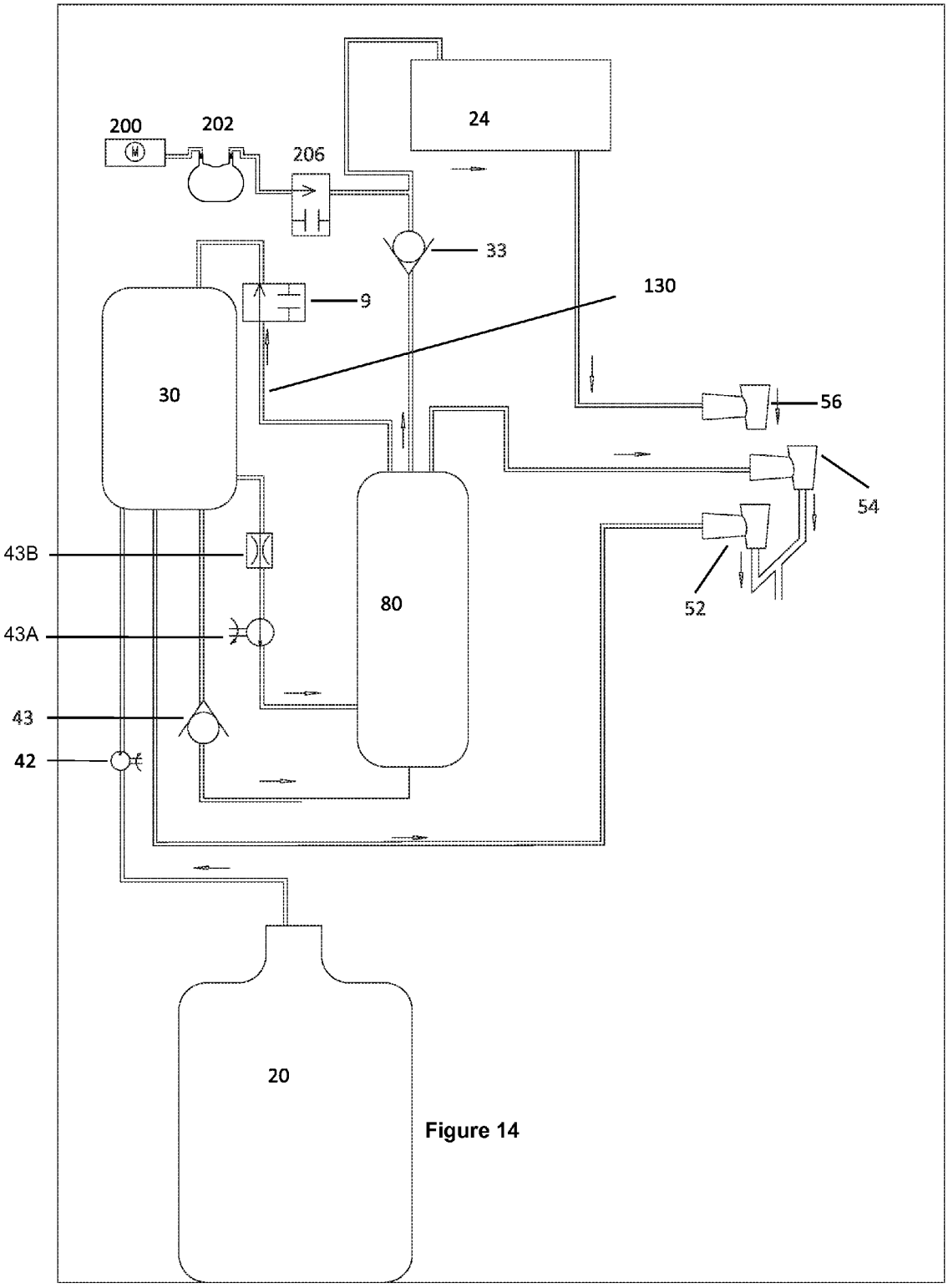



Figure 14

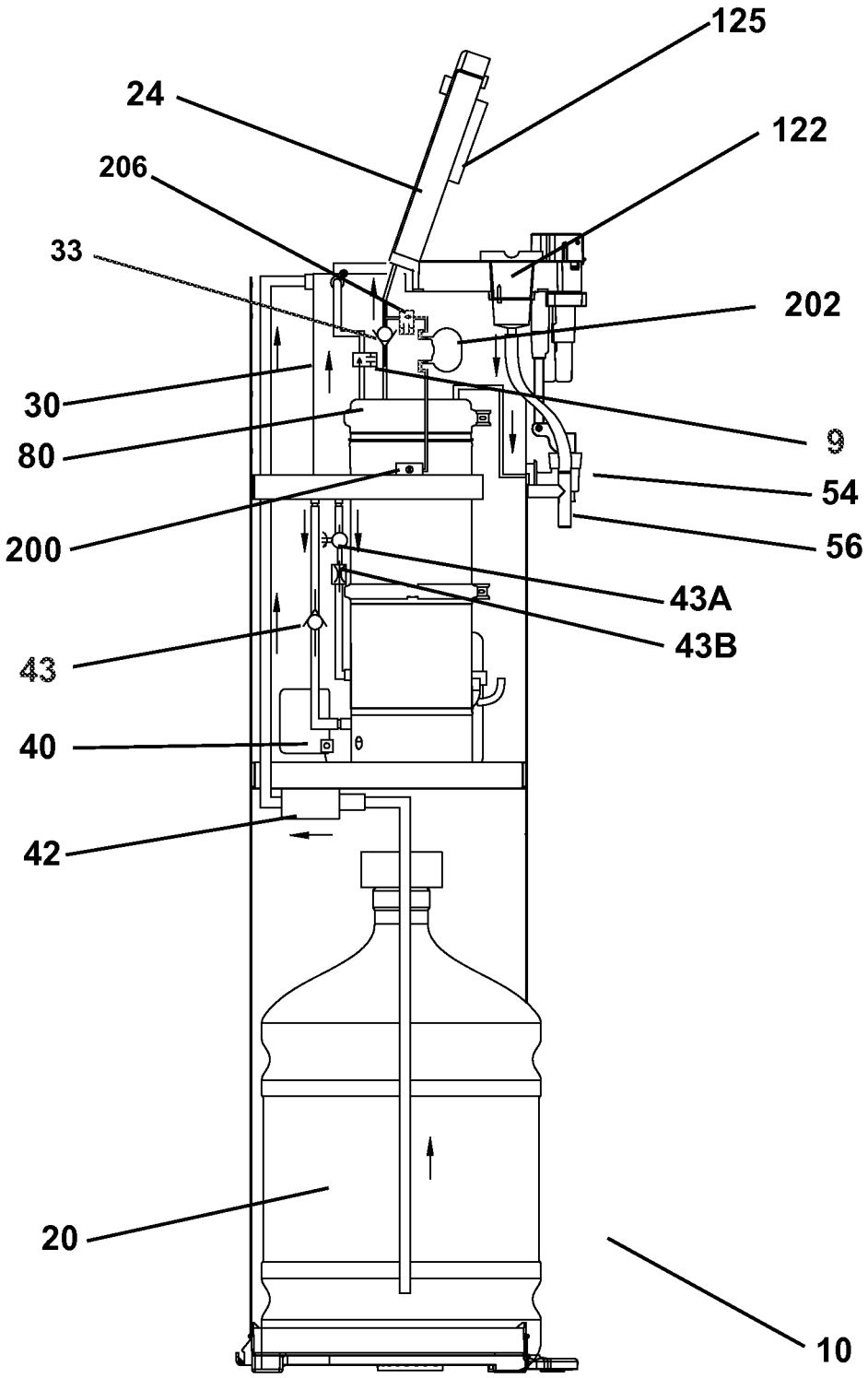



Figure 15

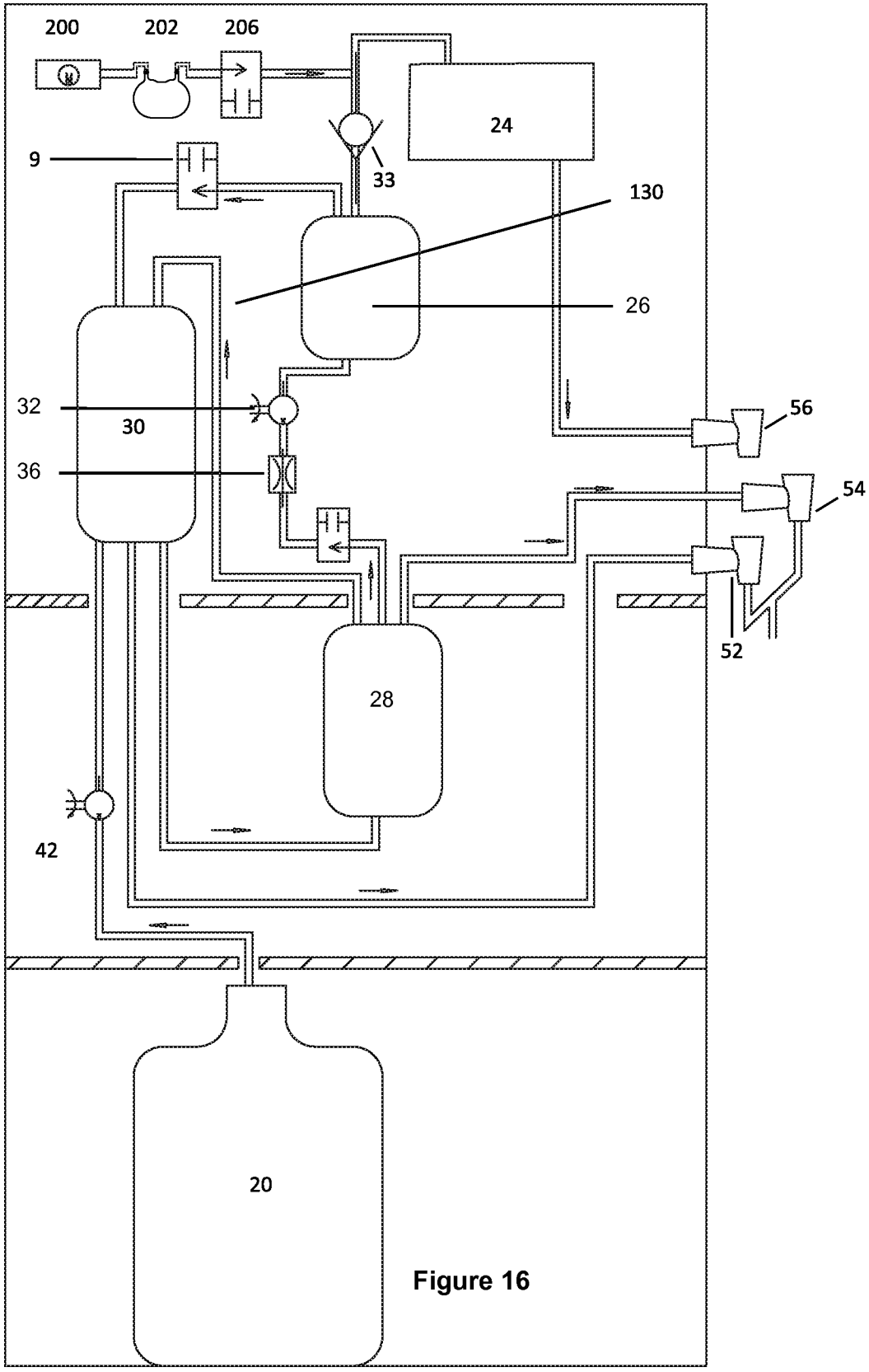



Figure 16

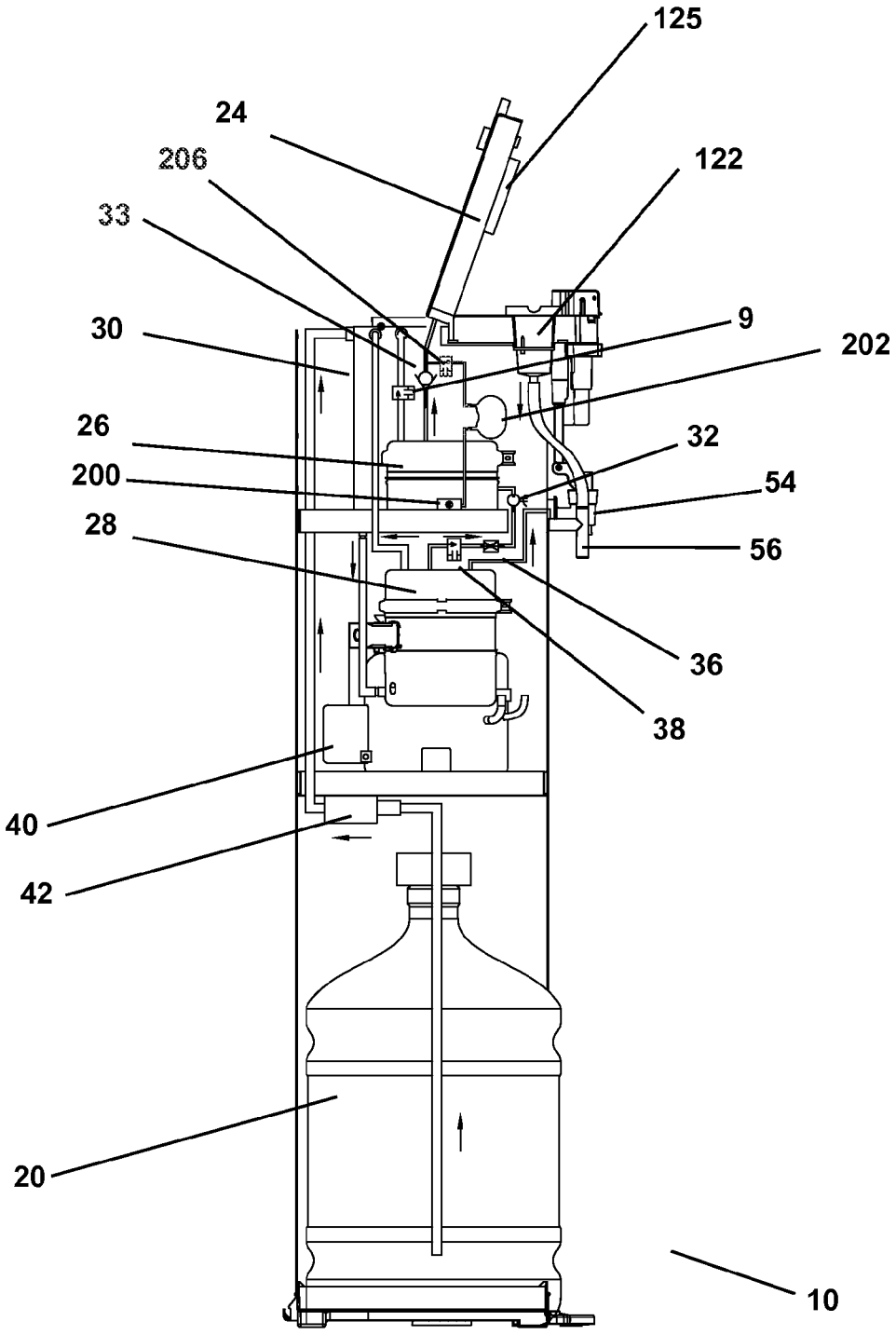



Figure 17

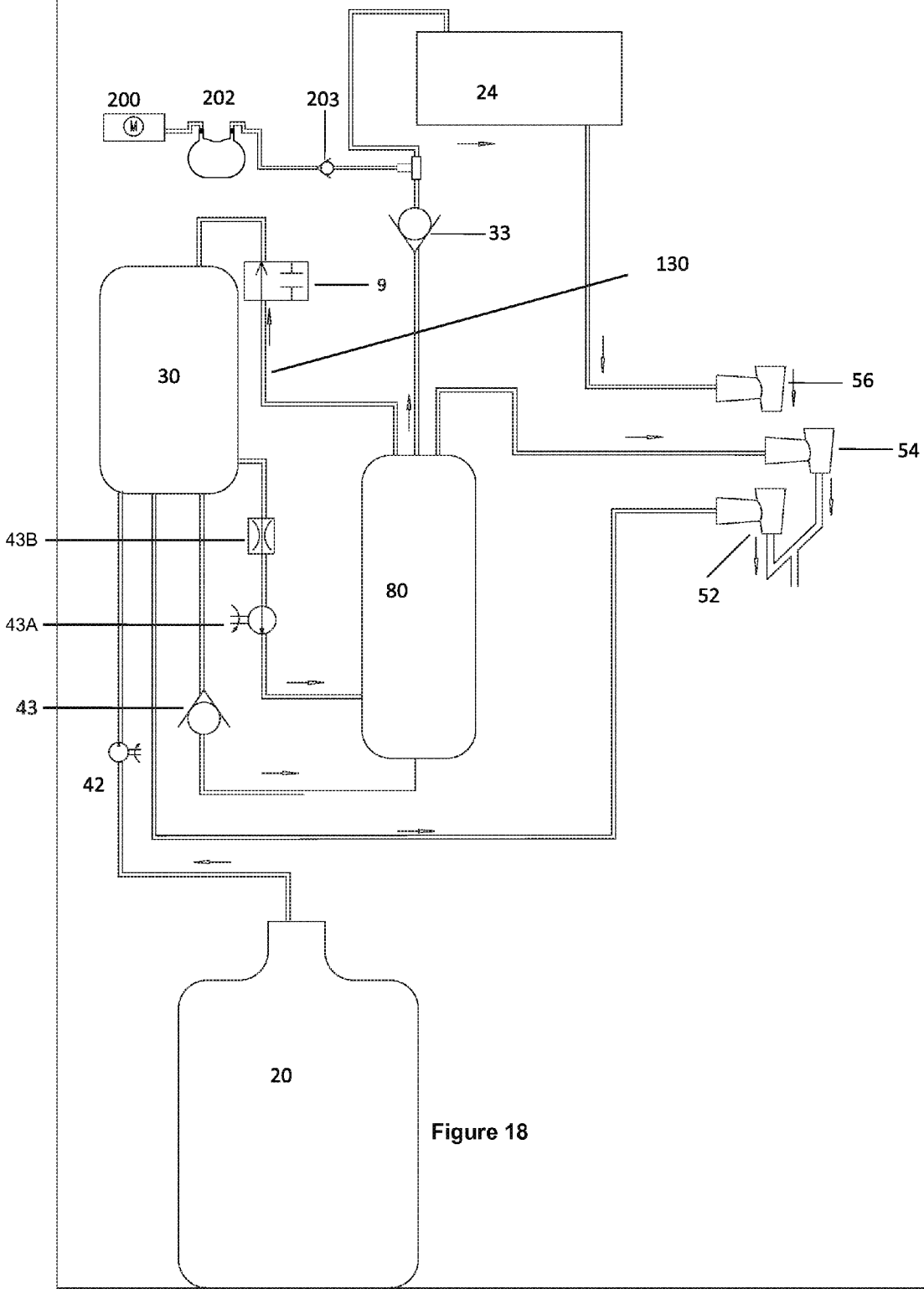



Figure 18

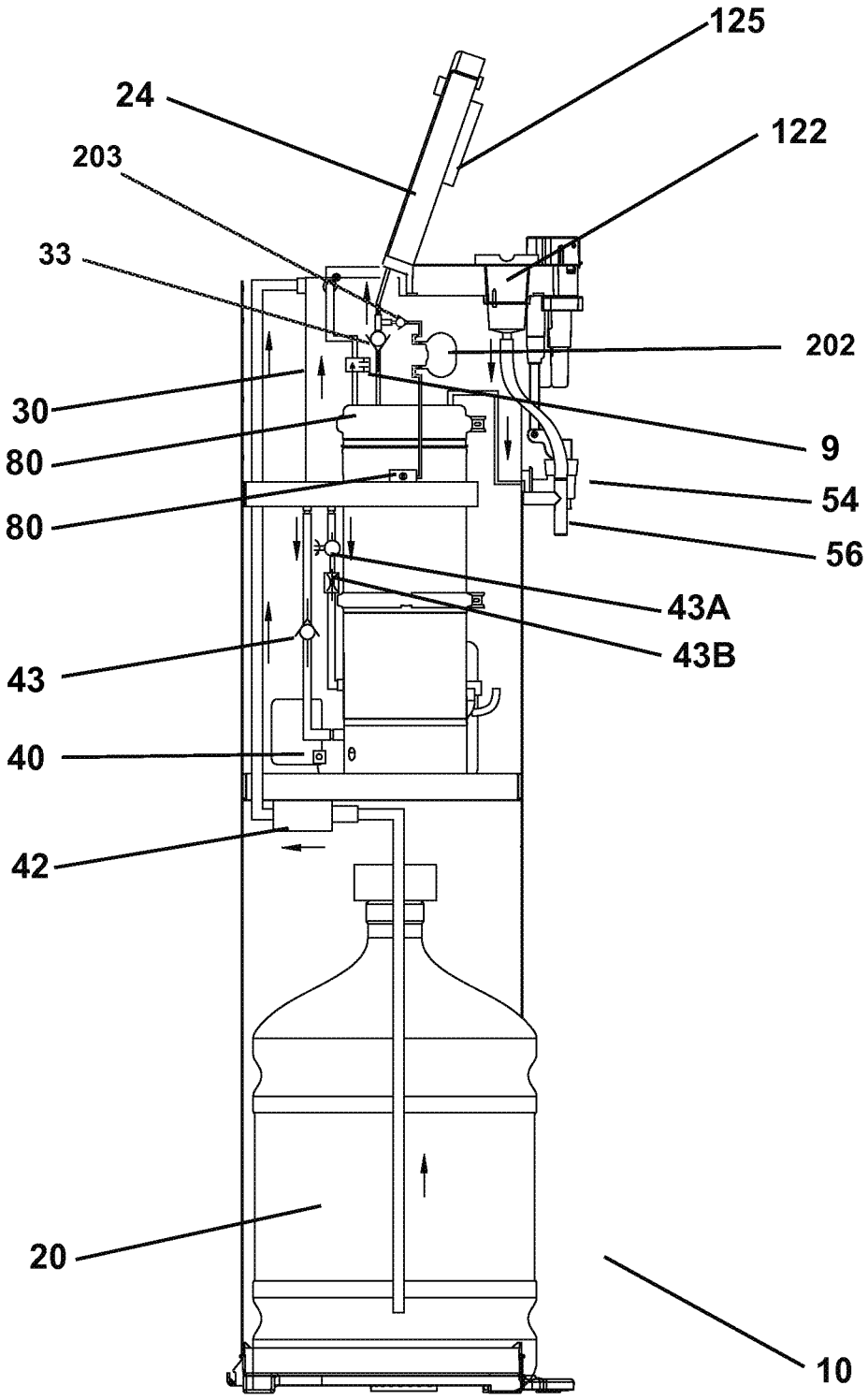



Figure 19

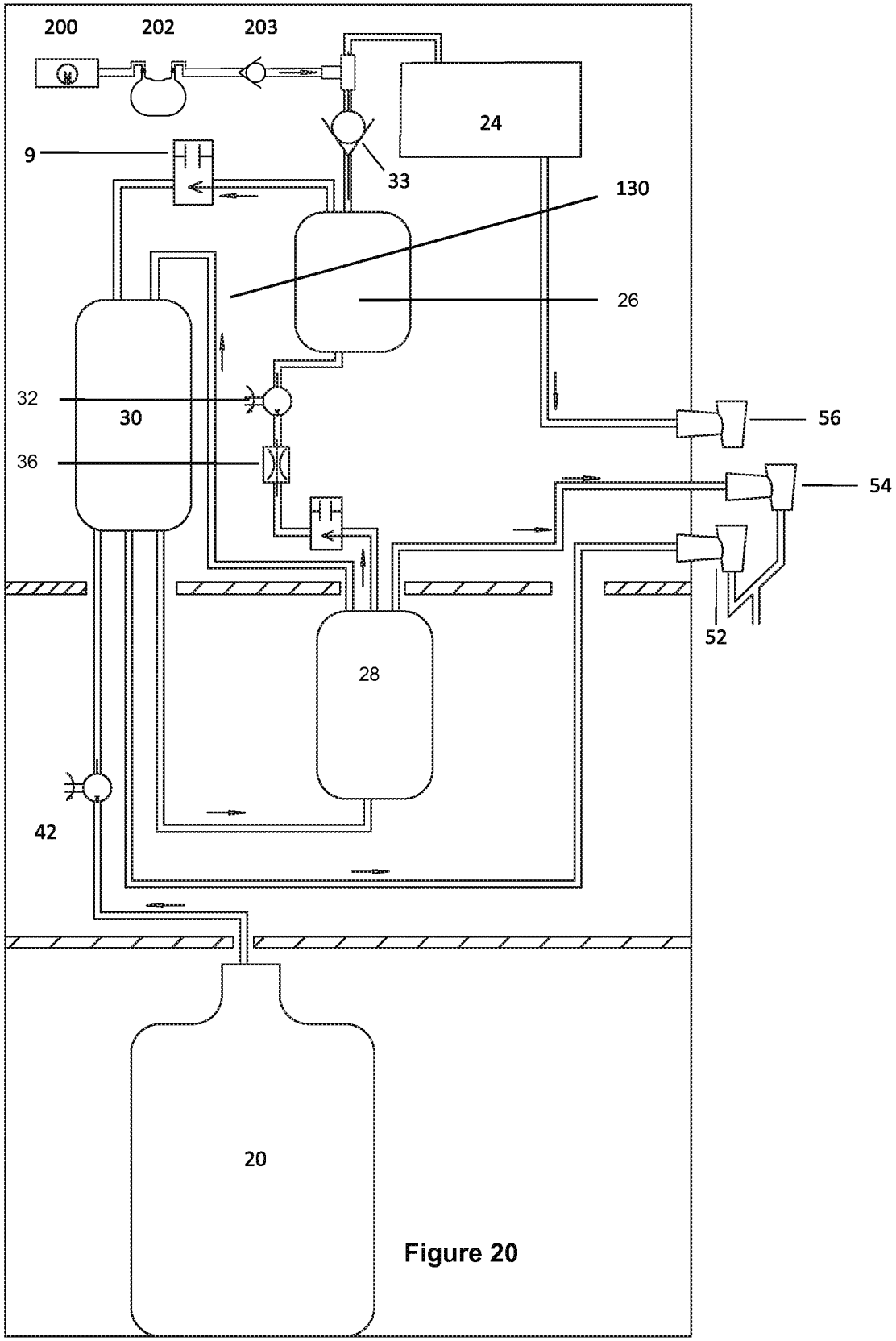



Figure 20

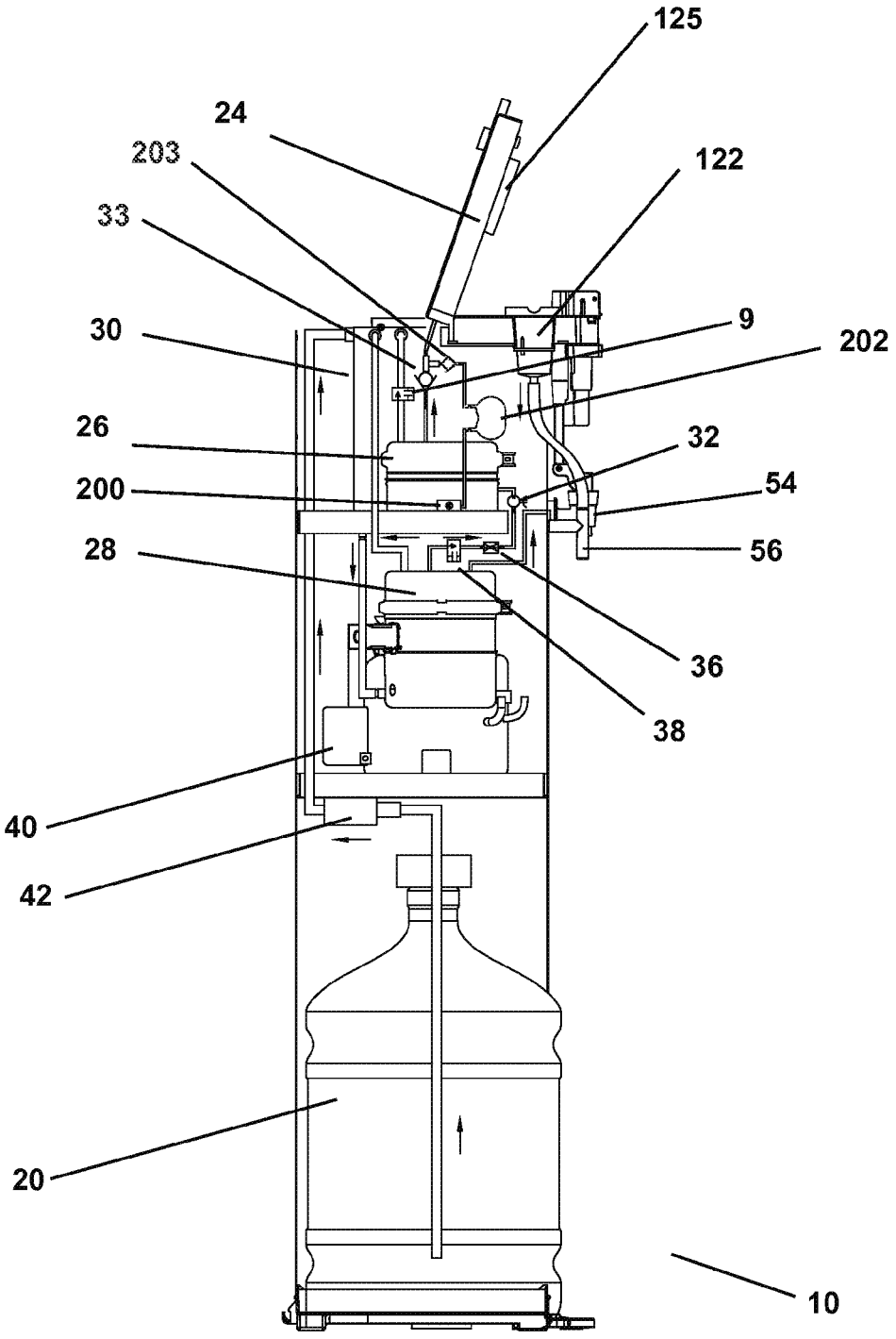



Figure 21

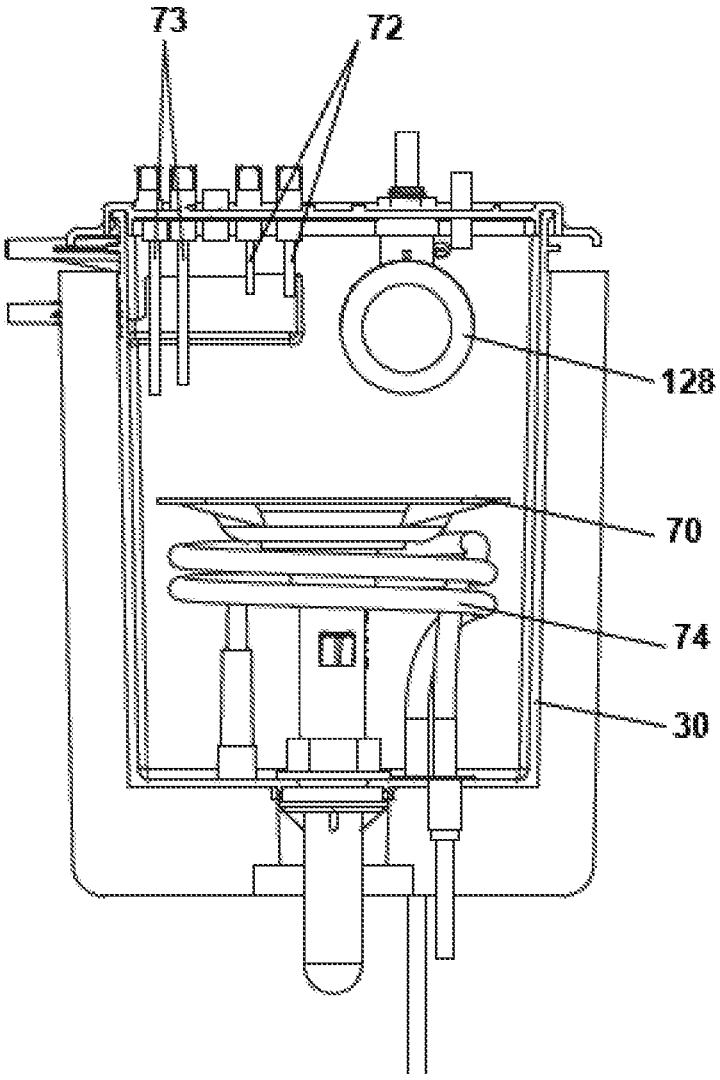



Figure 22

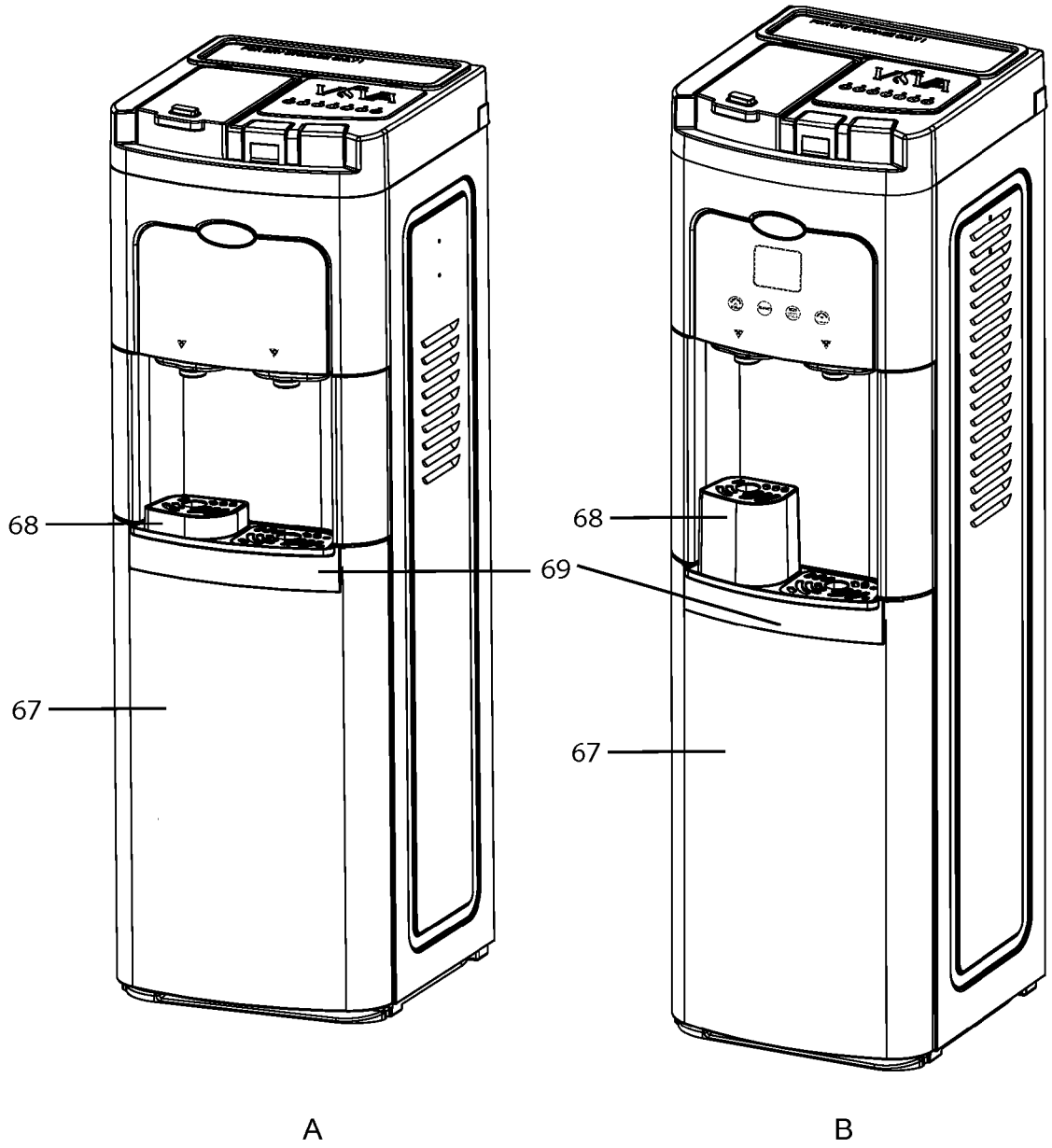



Figure 23

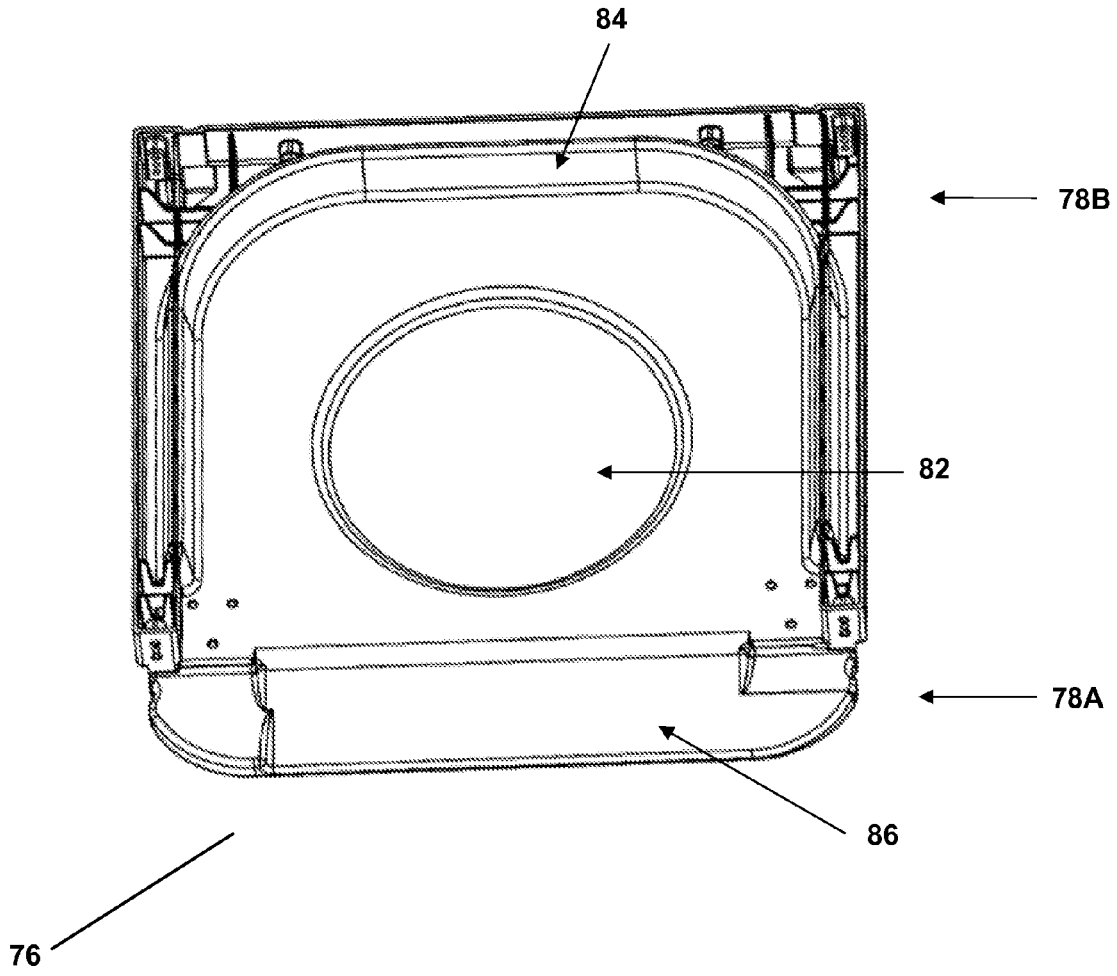



Figure 24

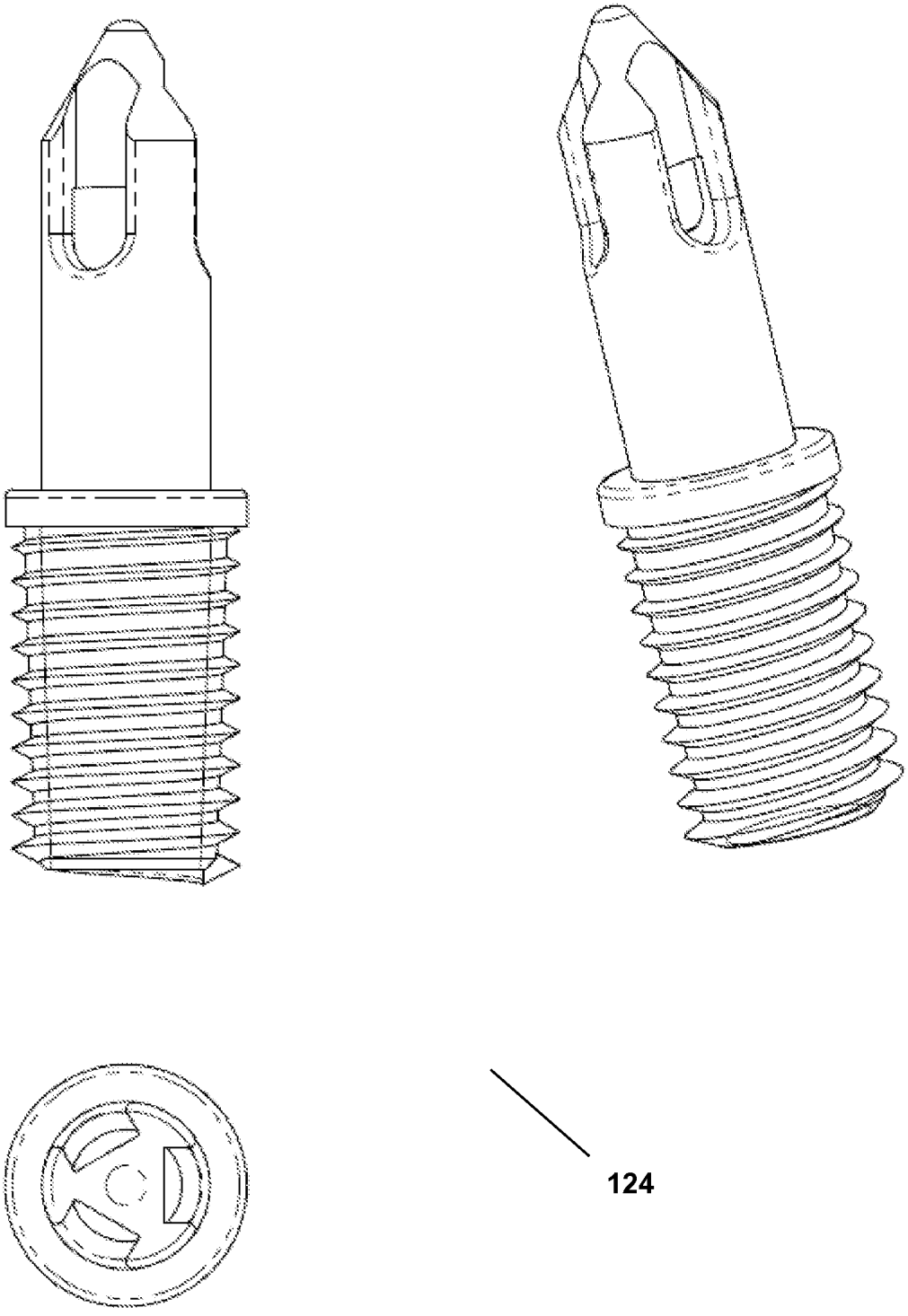



Figure 25

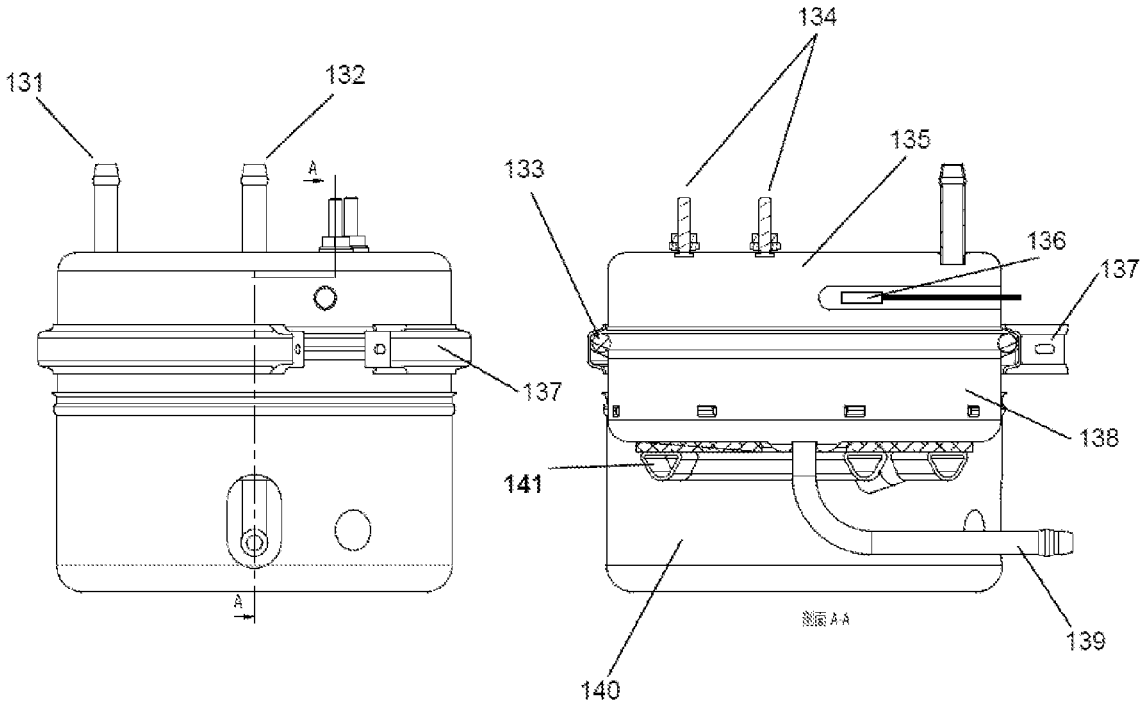



Figure 26

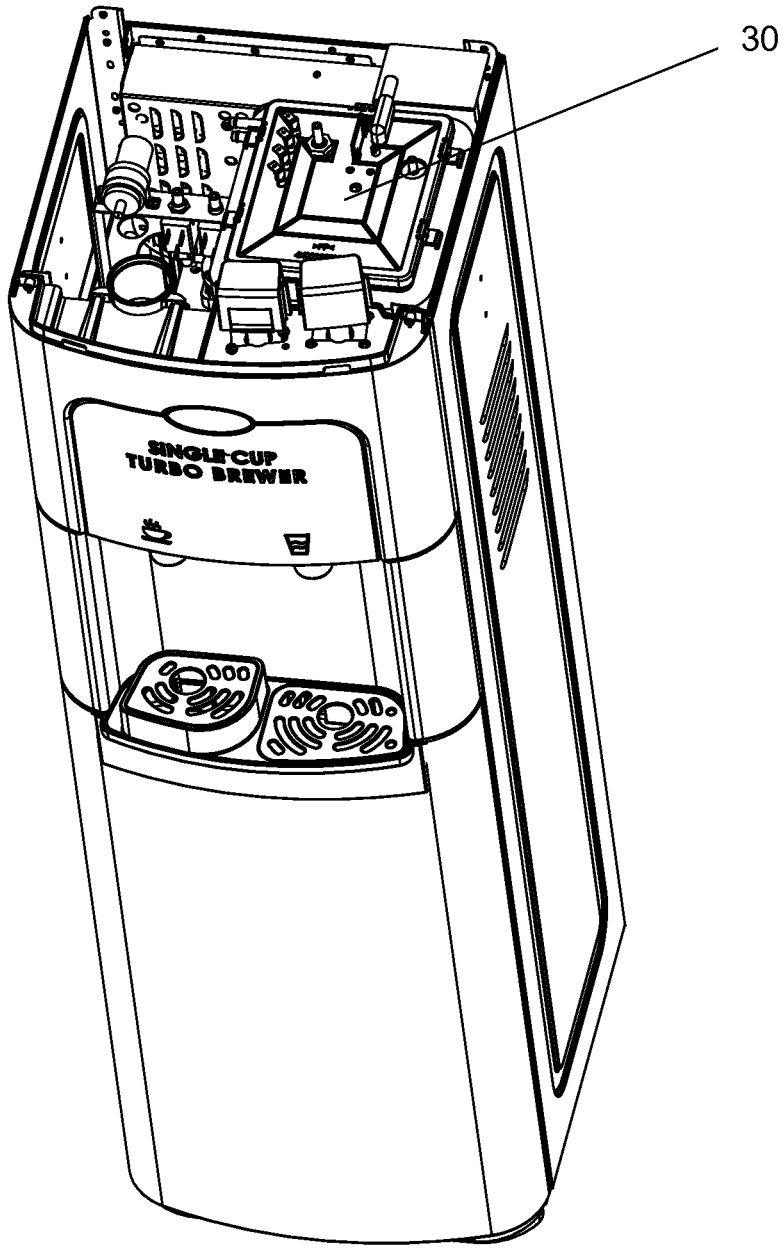



Figure 27

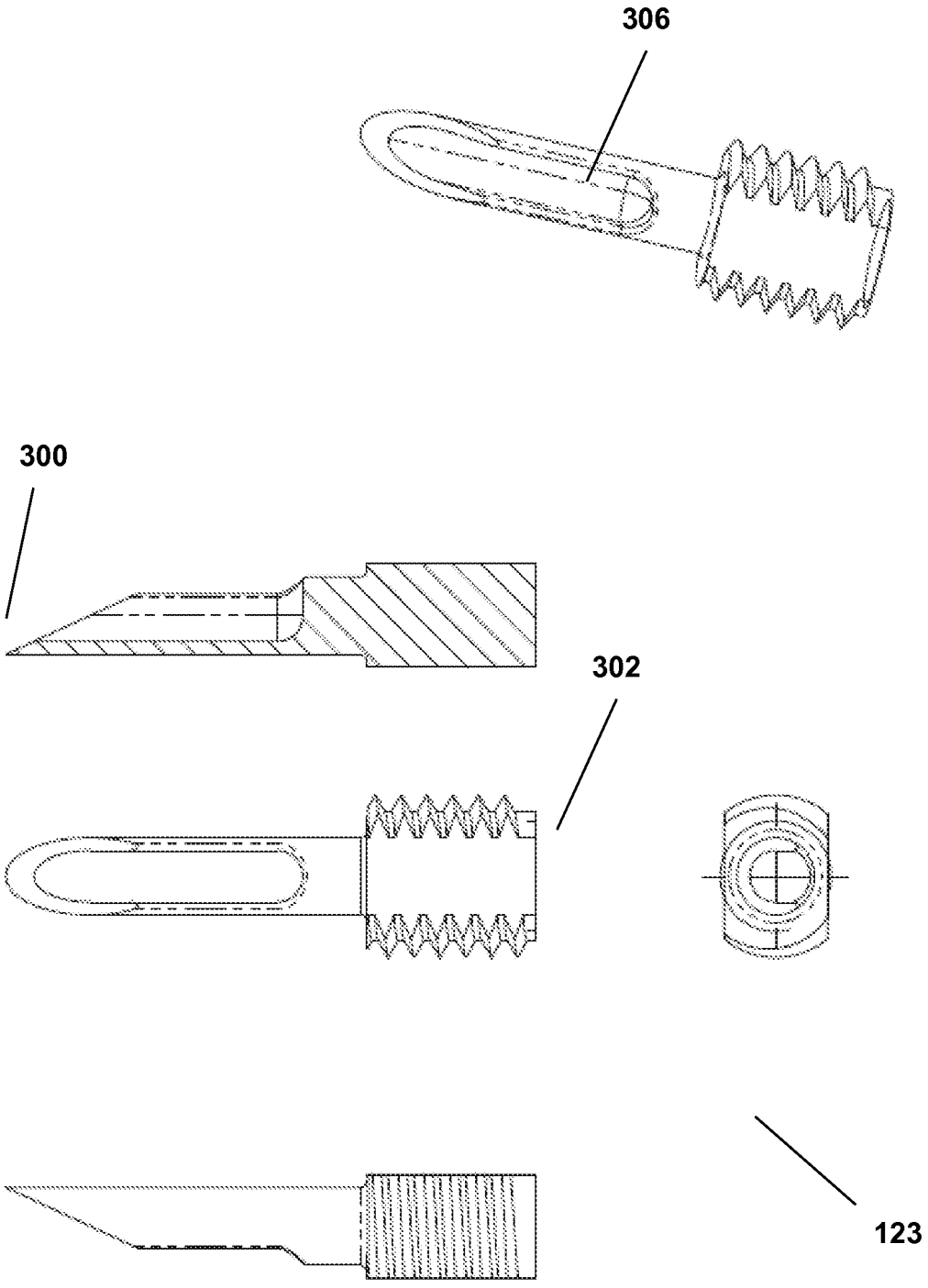



Figure 28

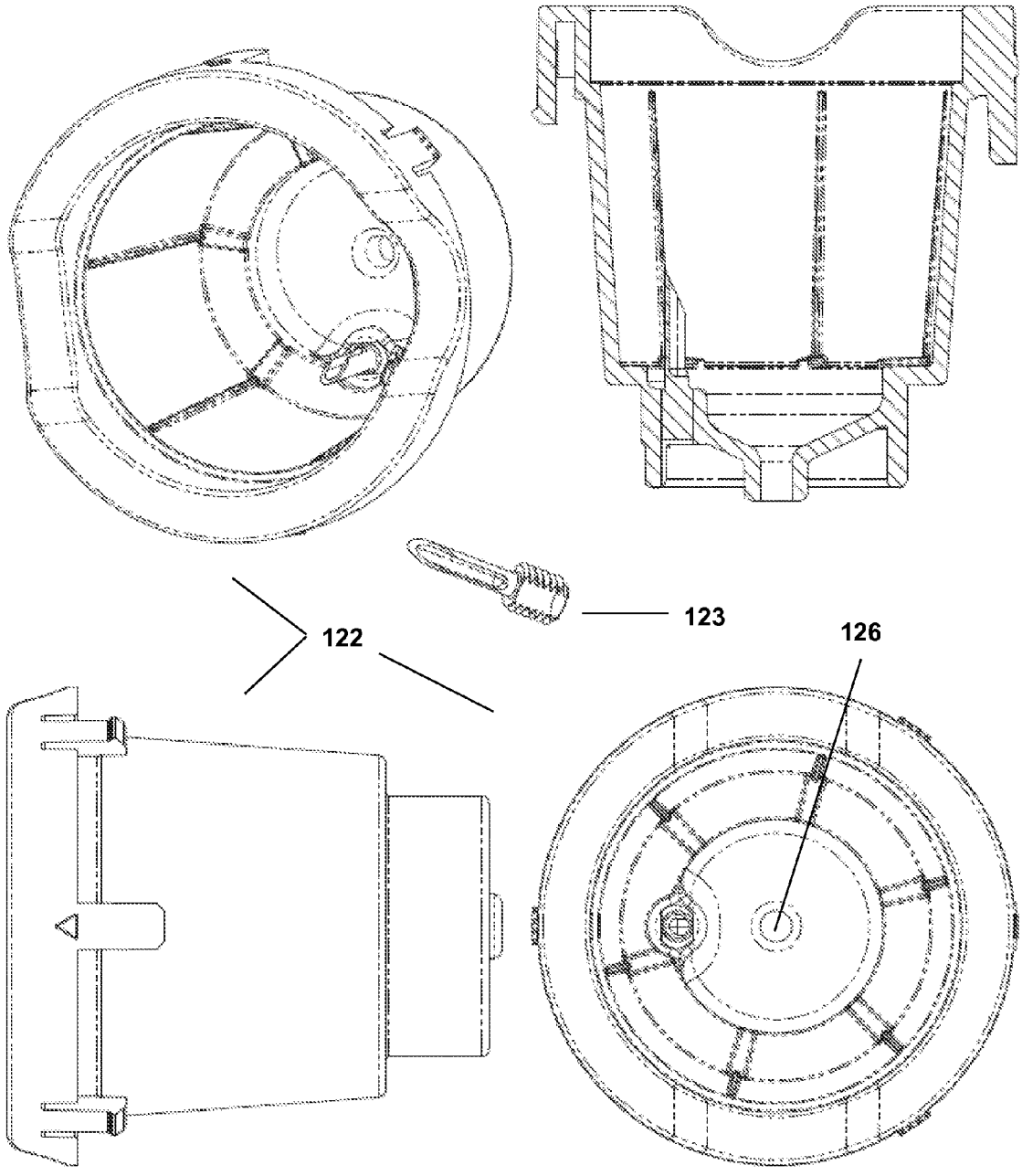



Figure 29

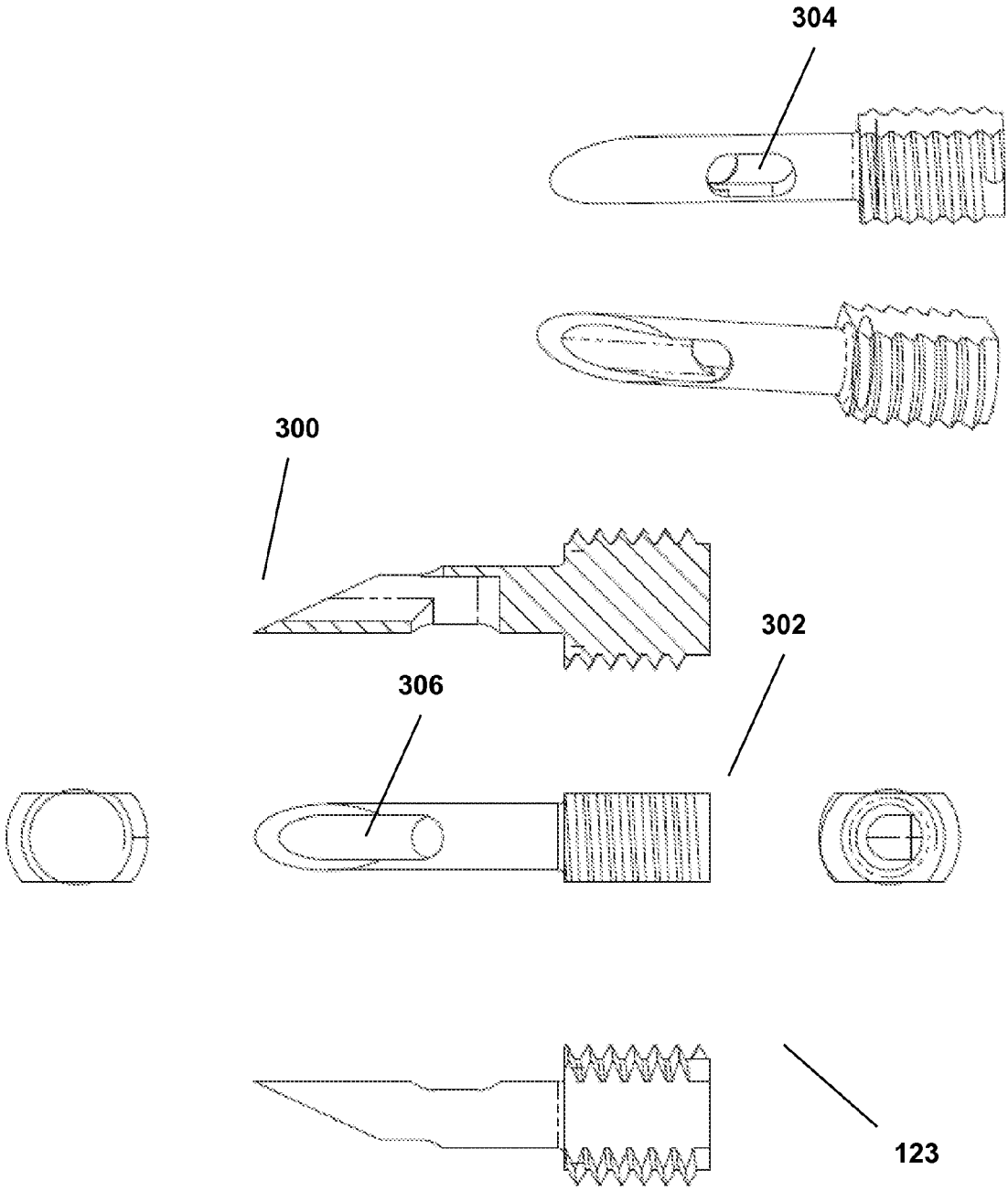



Figure 30

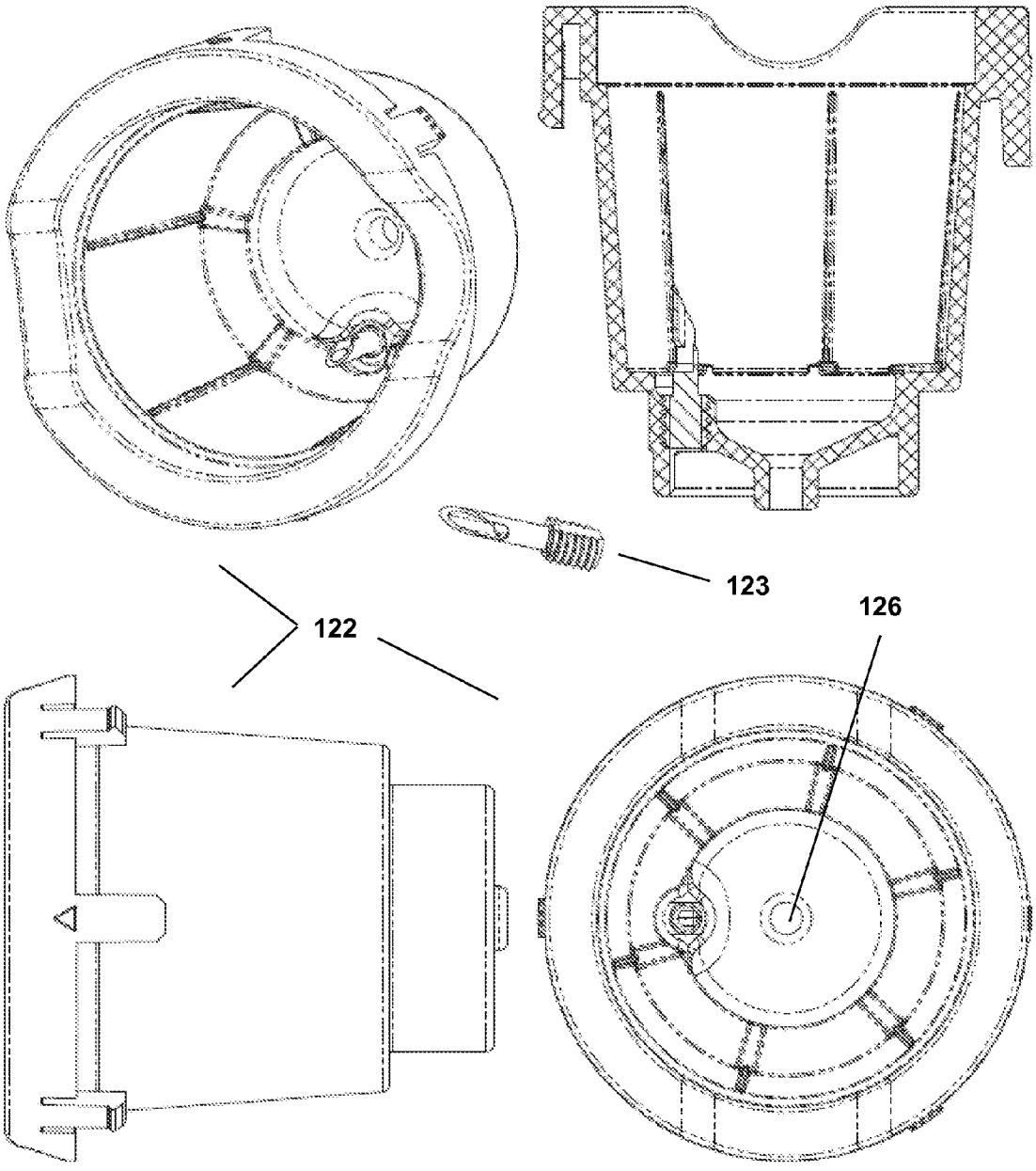



Figure 31

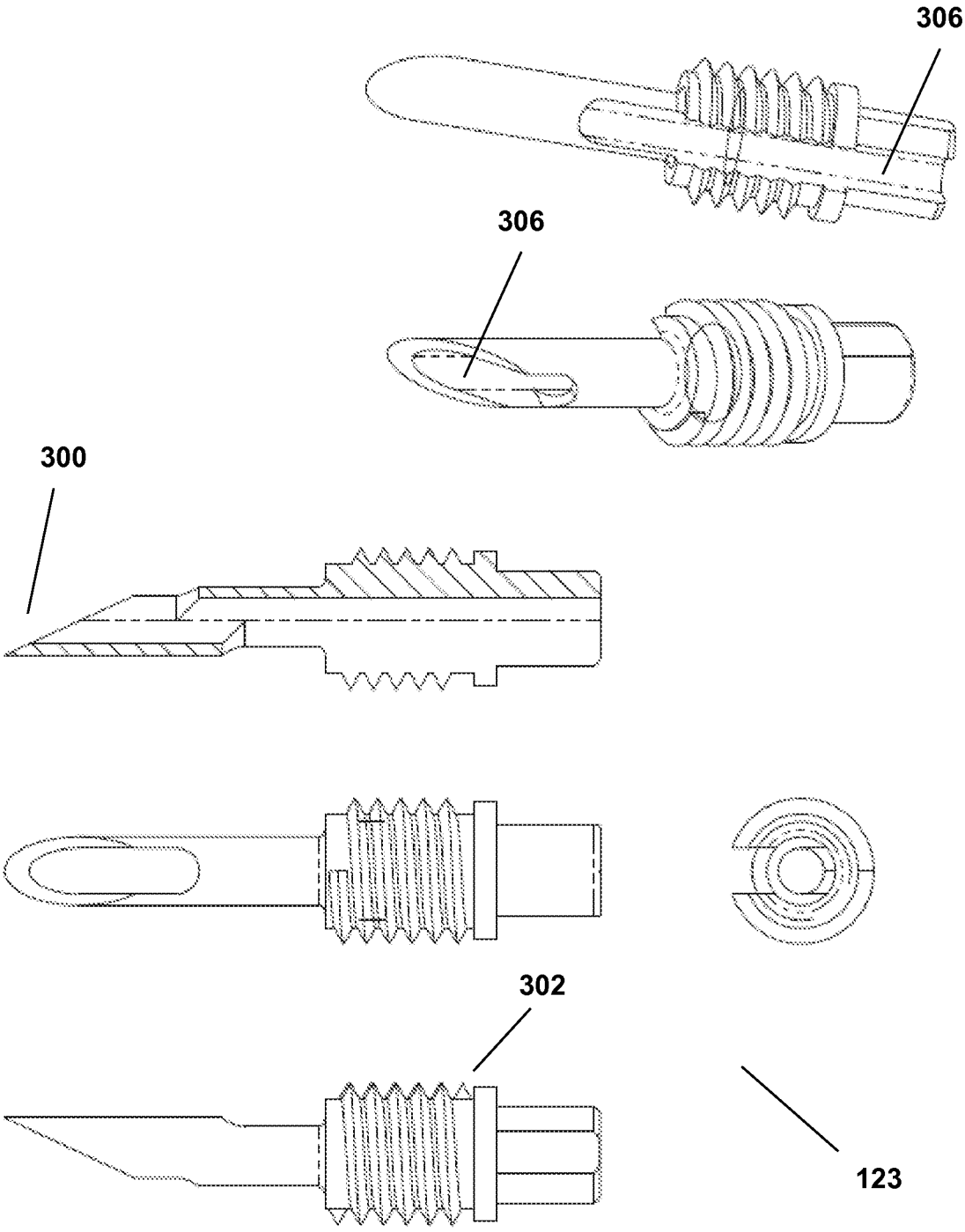



Figure 32

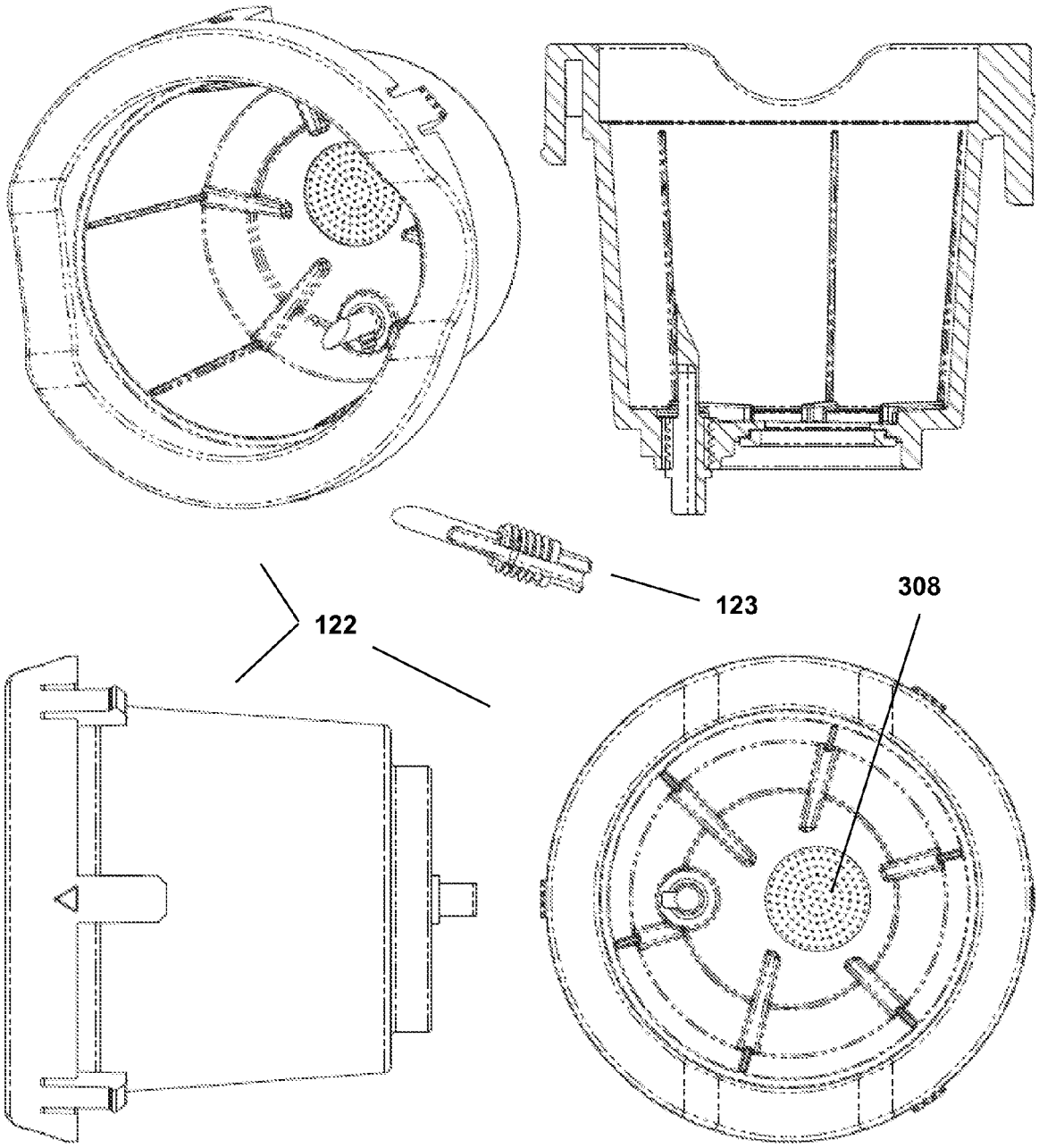



Figure 33

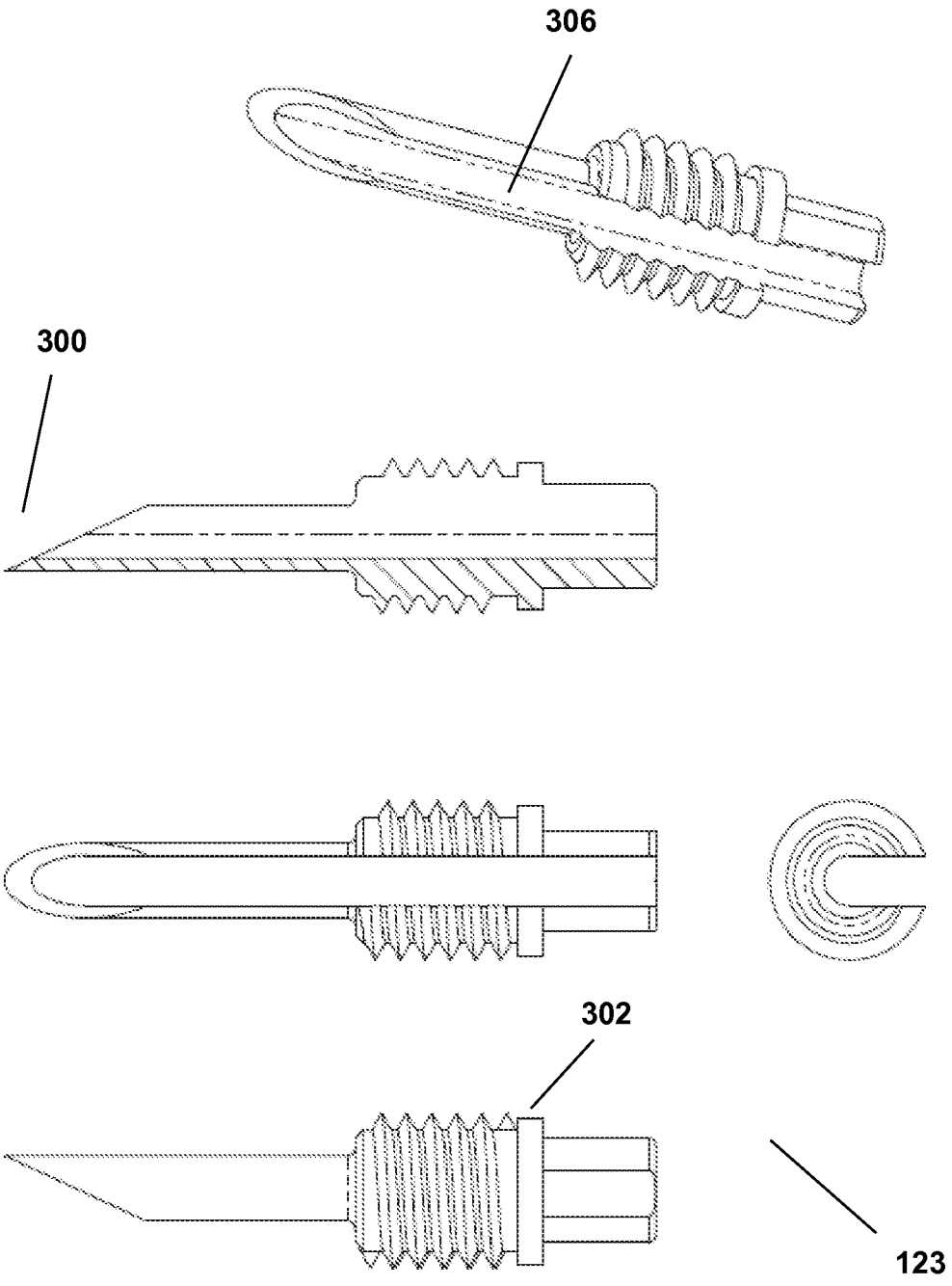



Figure 34

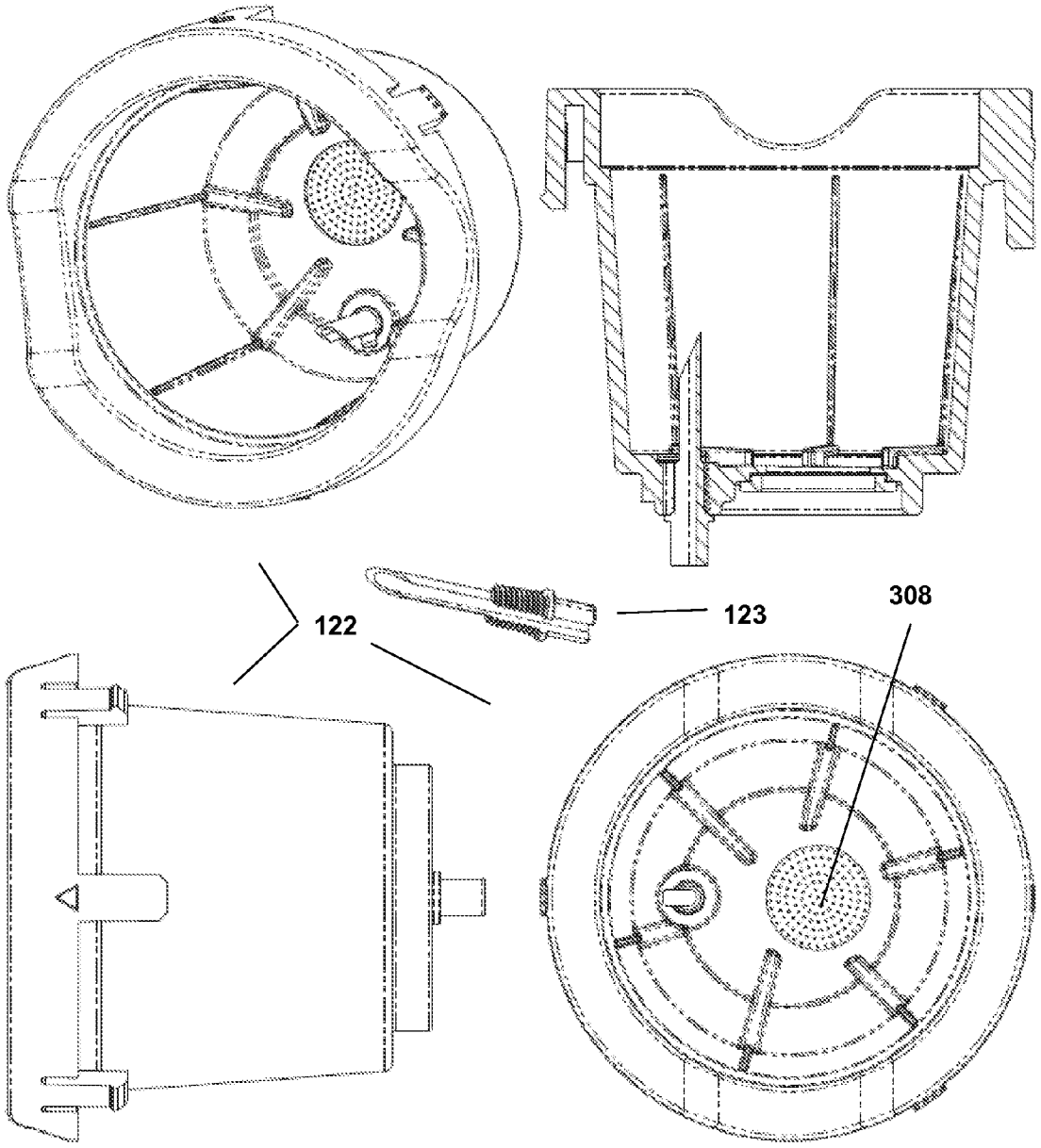



Figure 35

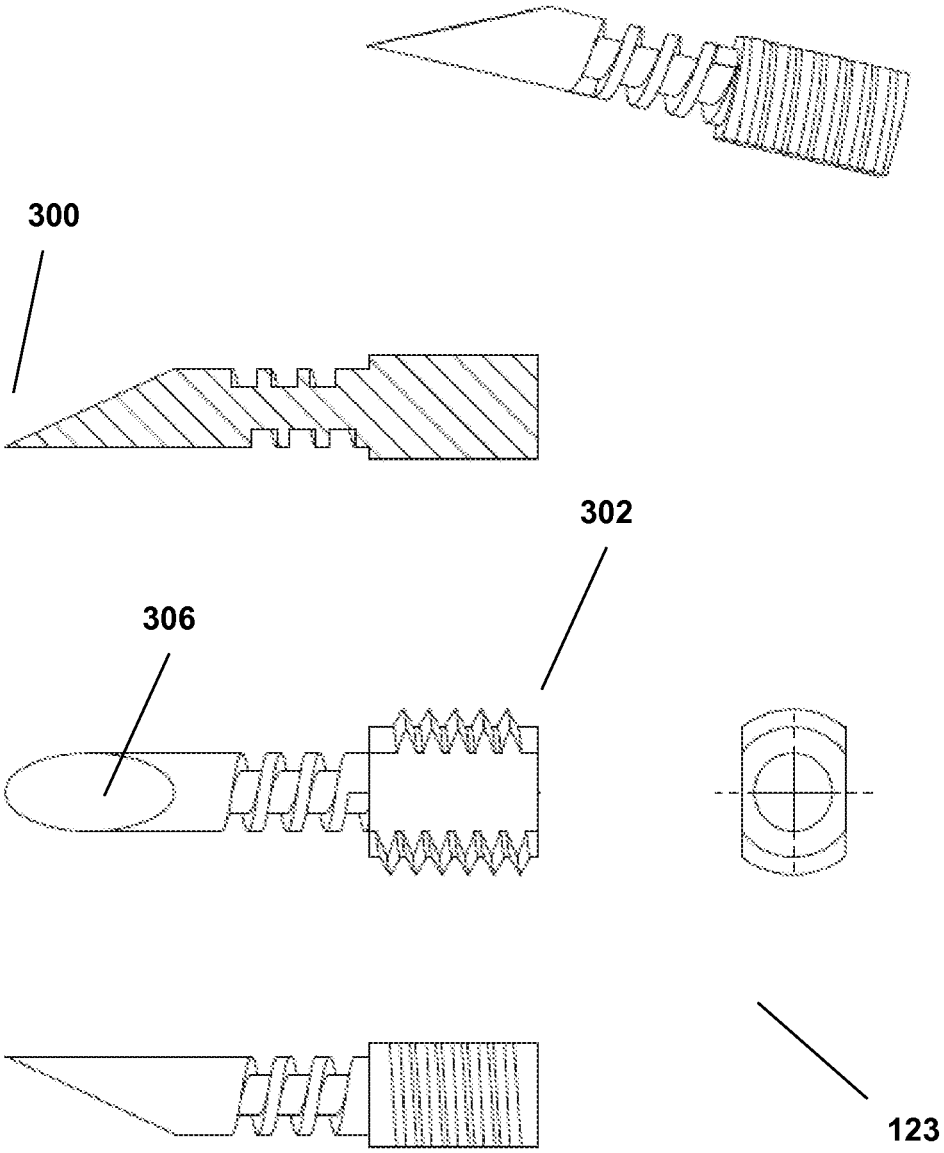



Figure 36

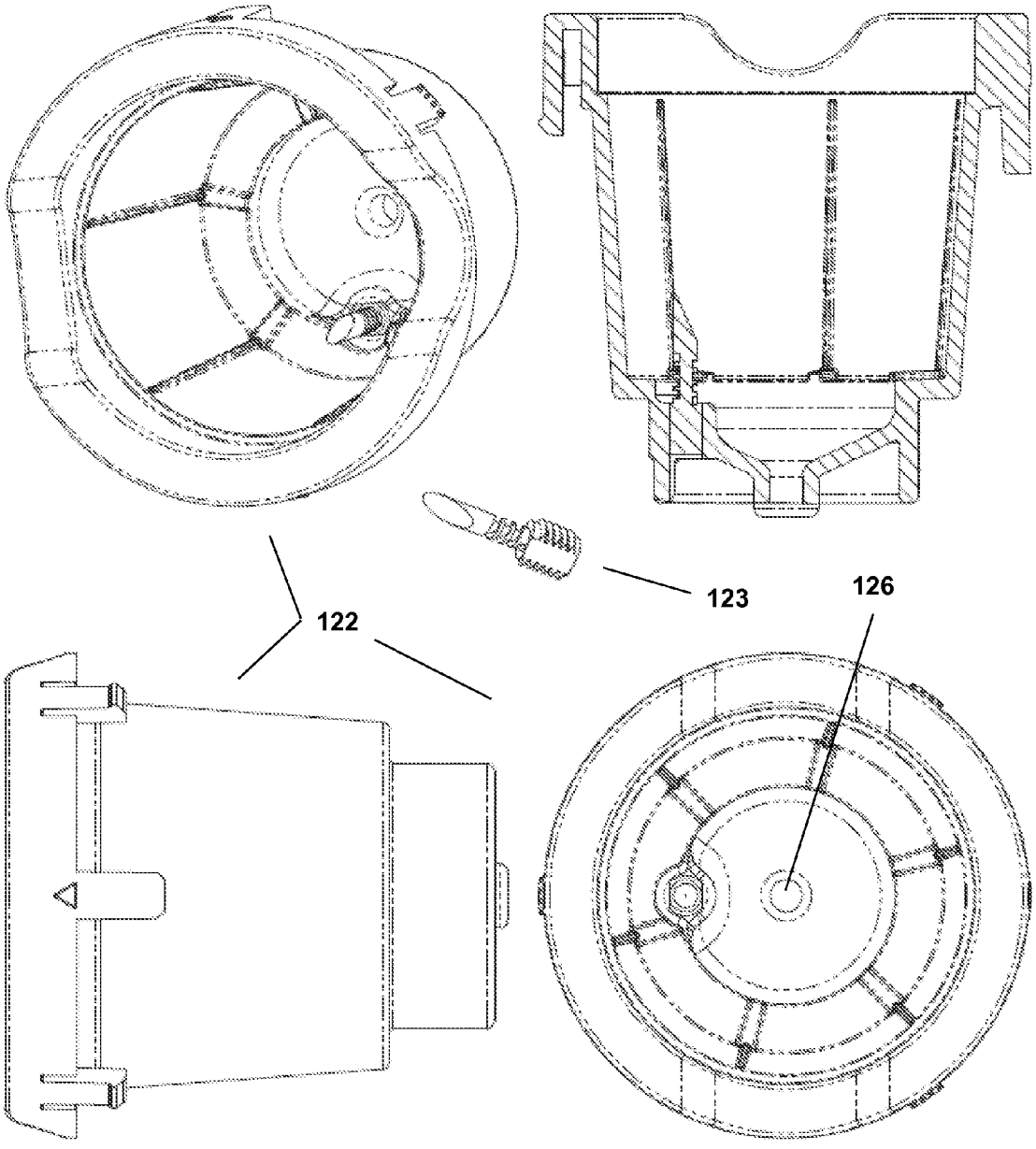



Figure 37

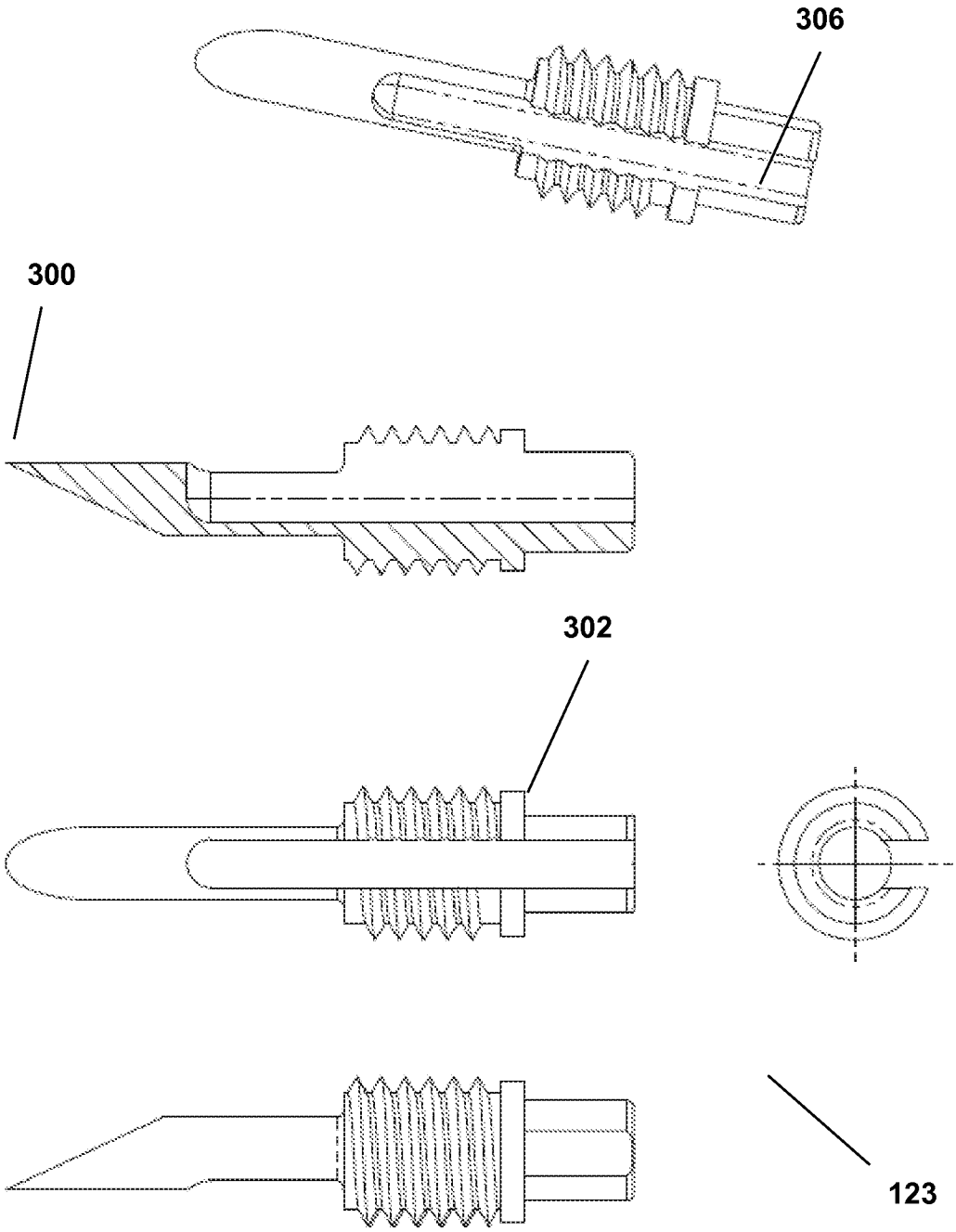



Figure 38

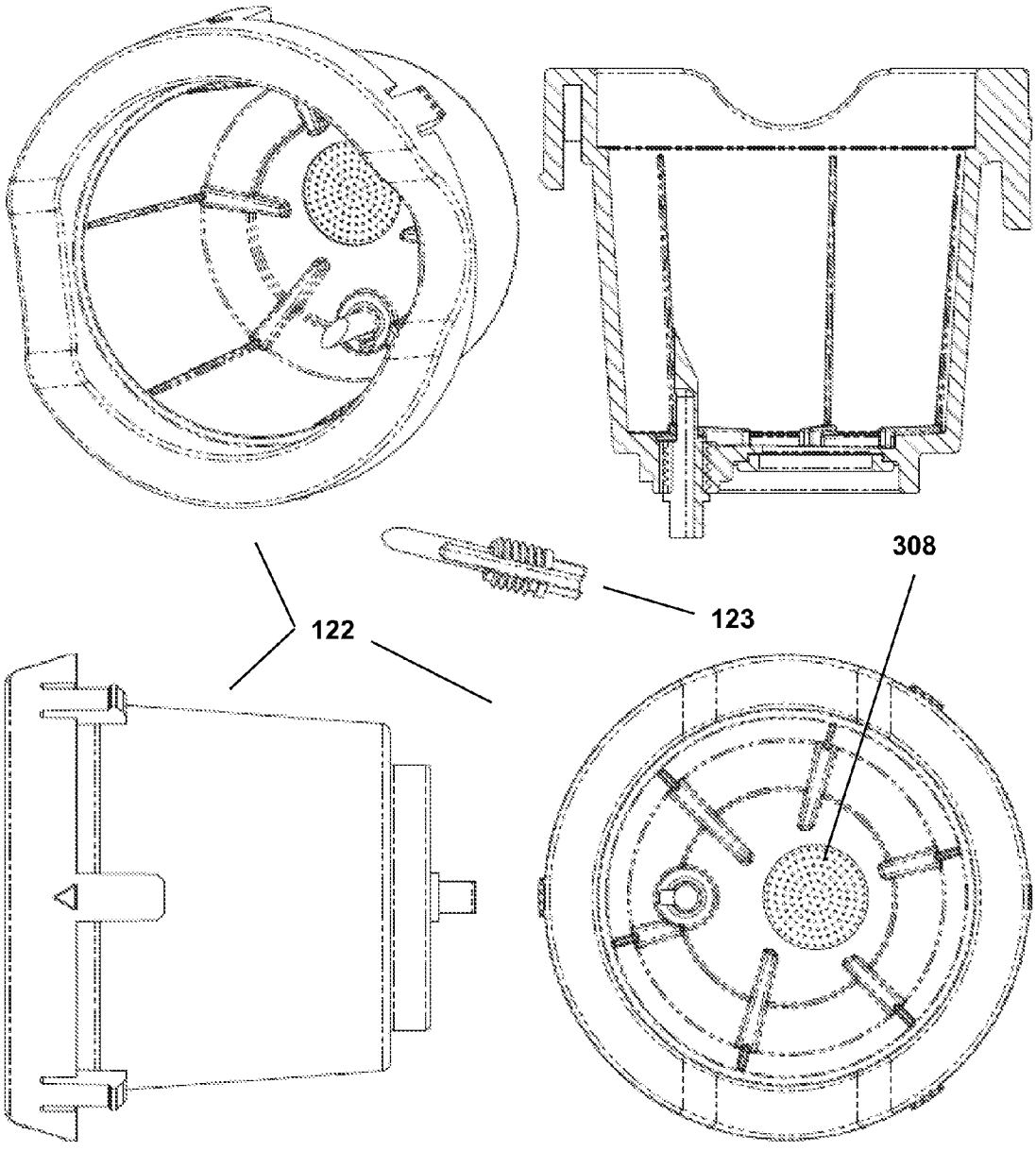



Figure 39

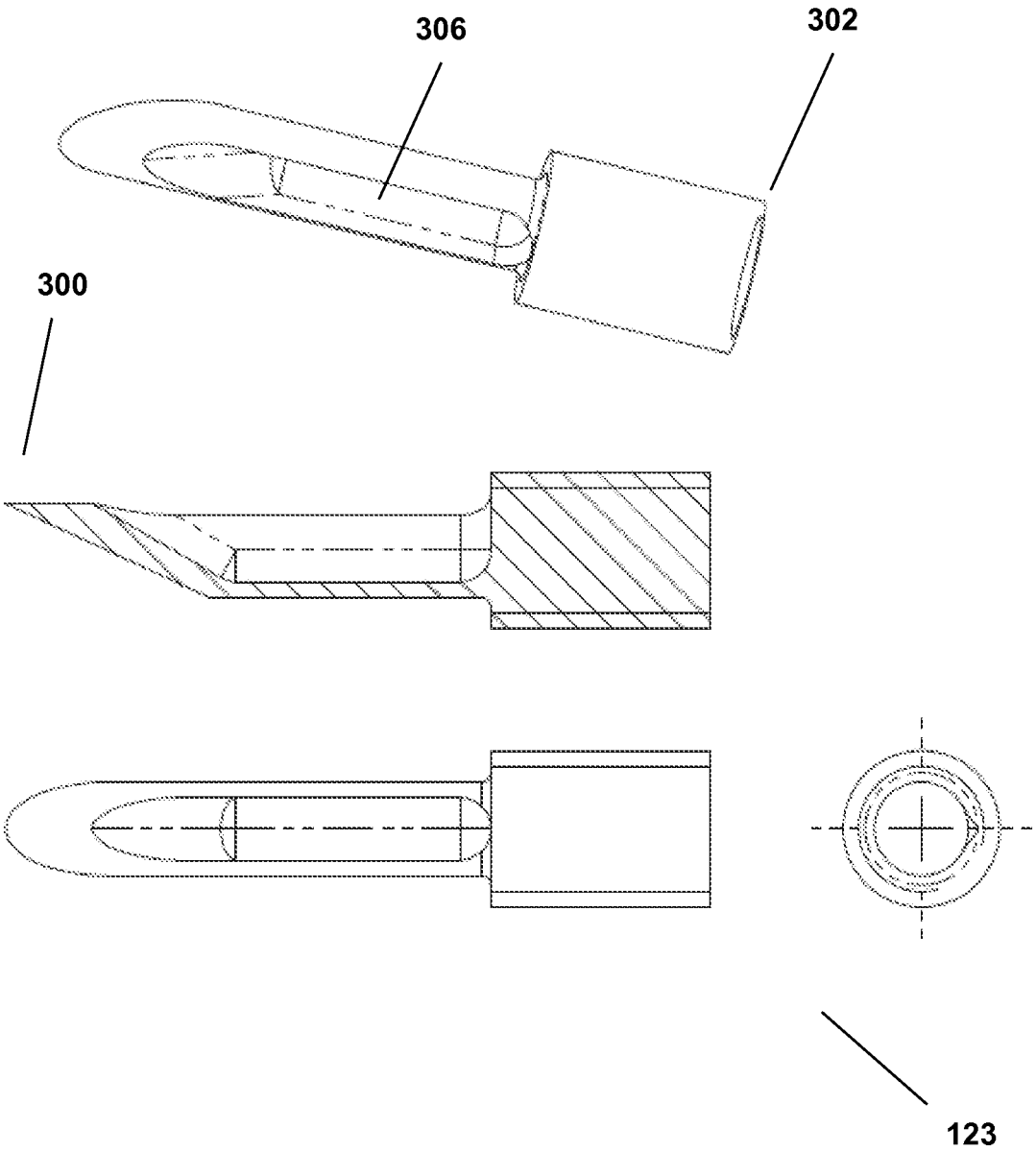



Figure 40

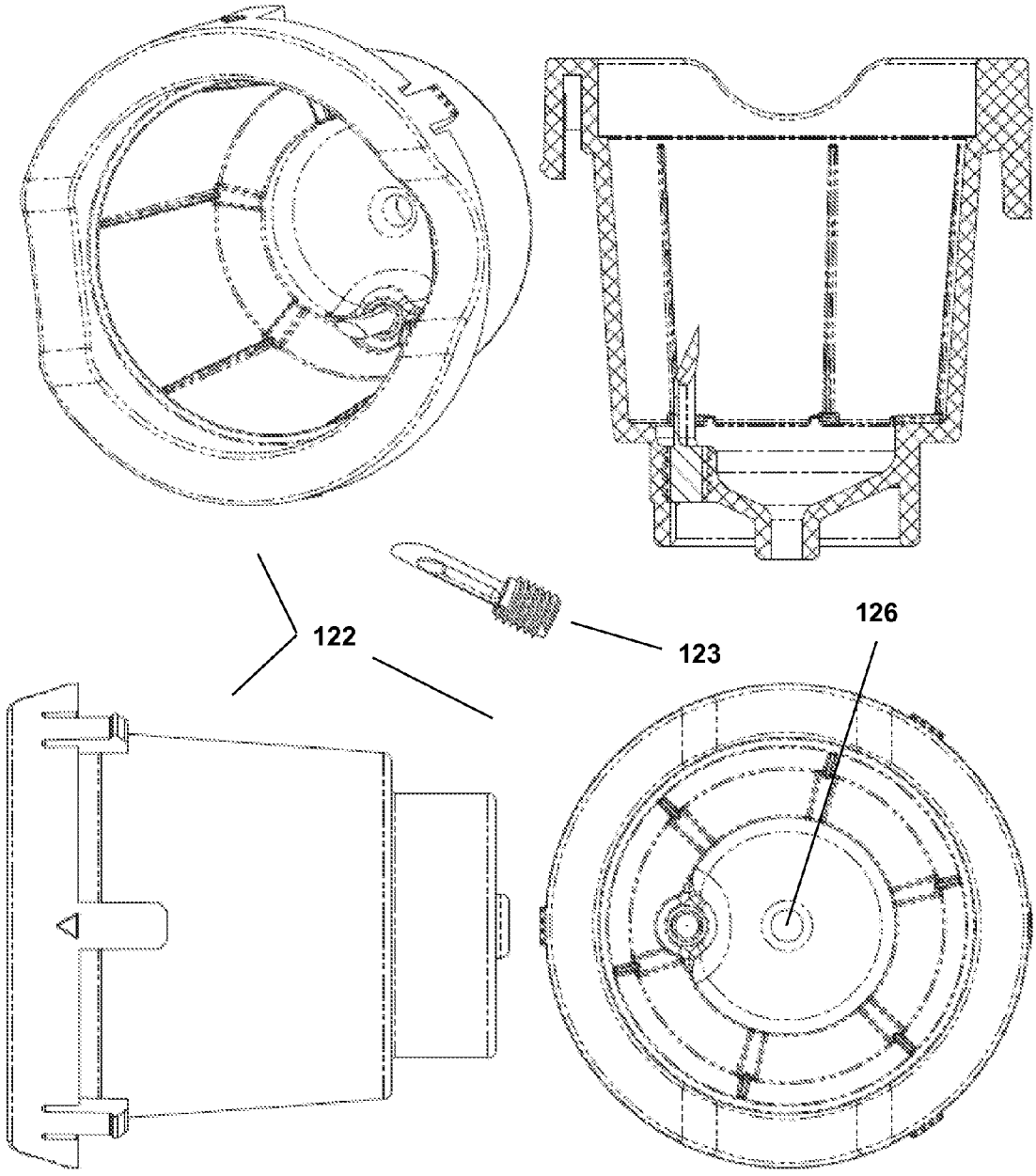



Figure 41

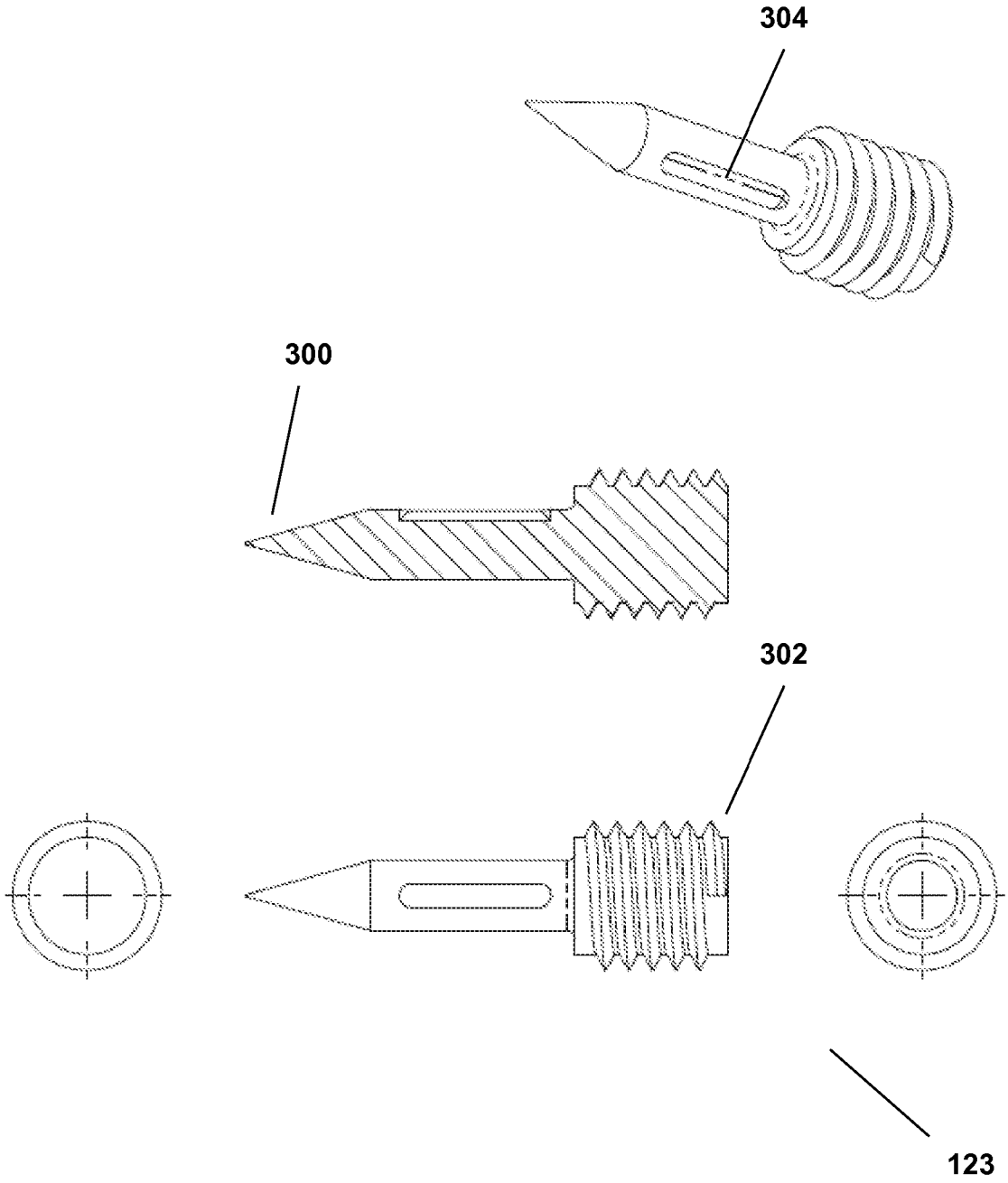



Figure 42

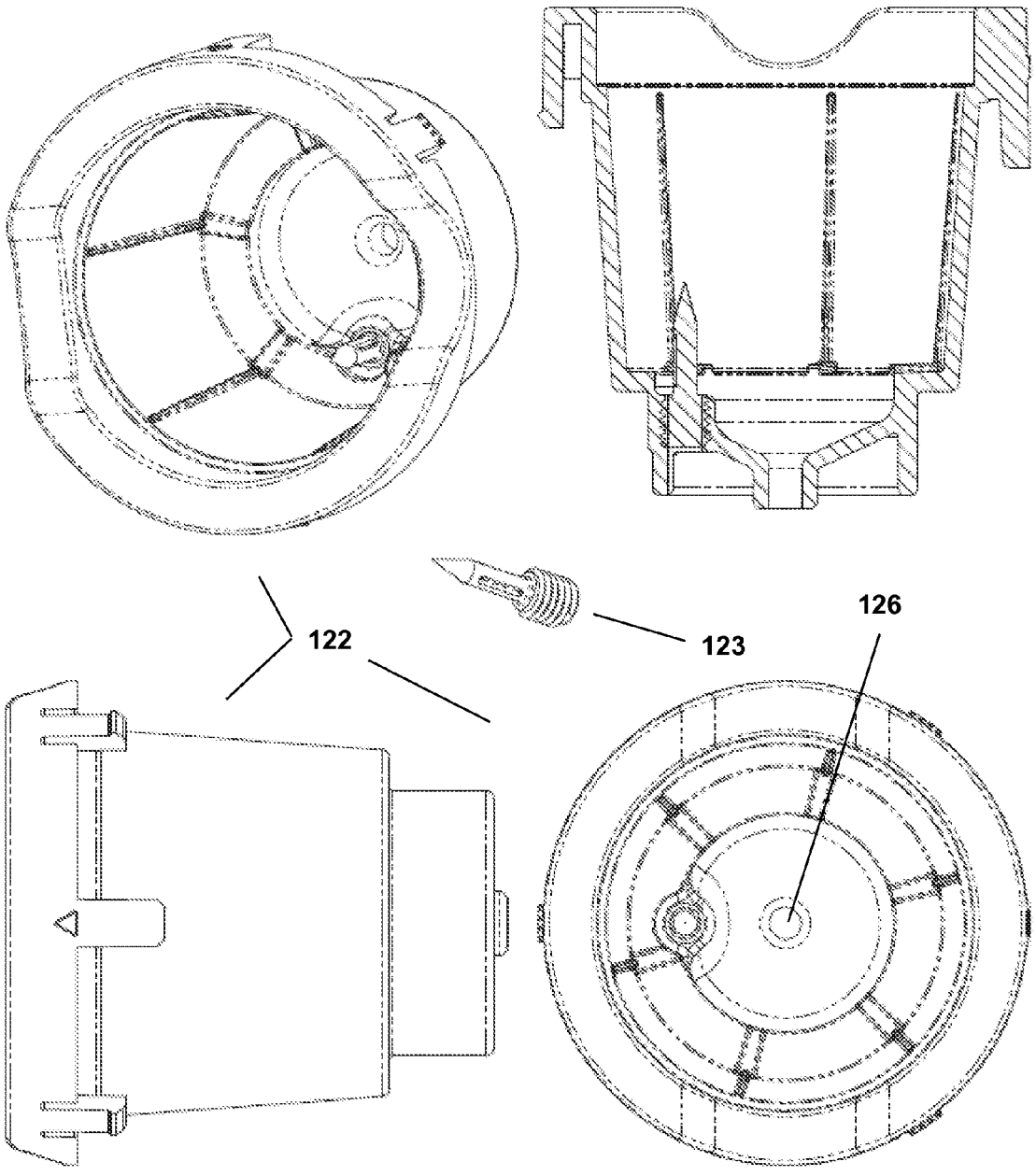



Figure 43

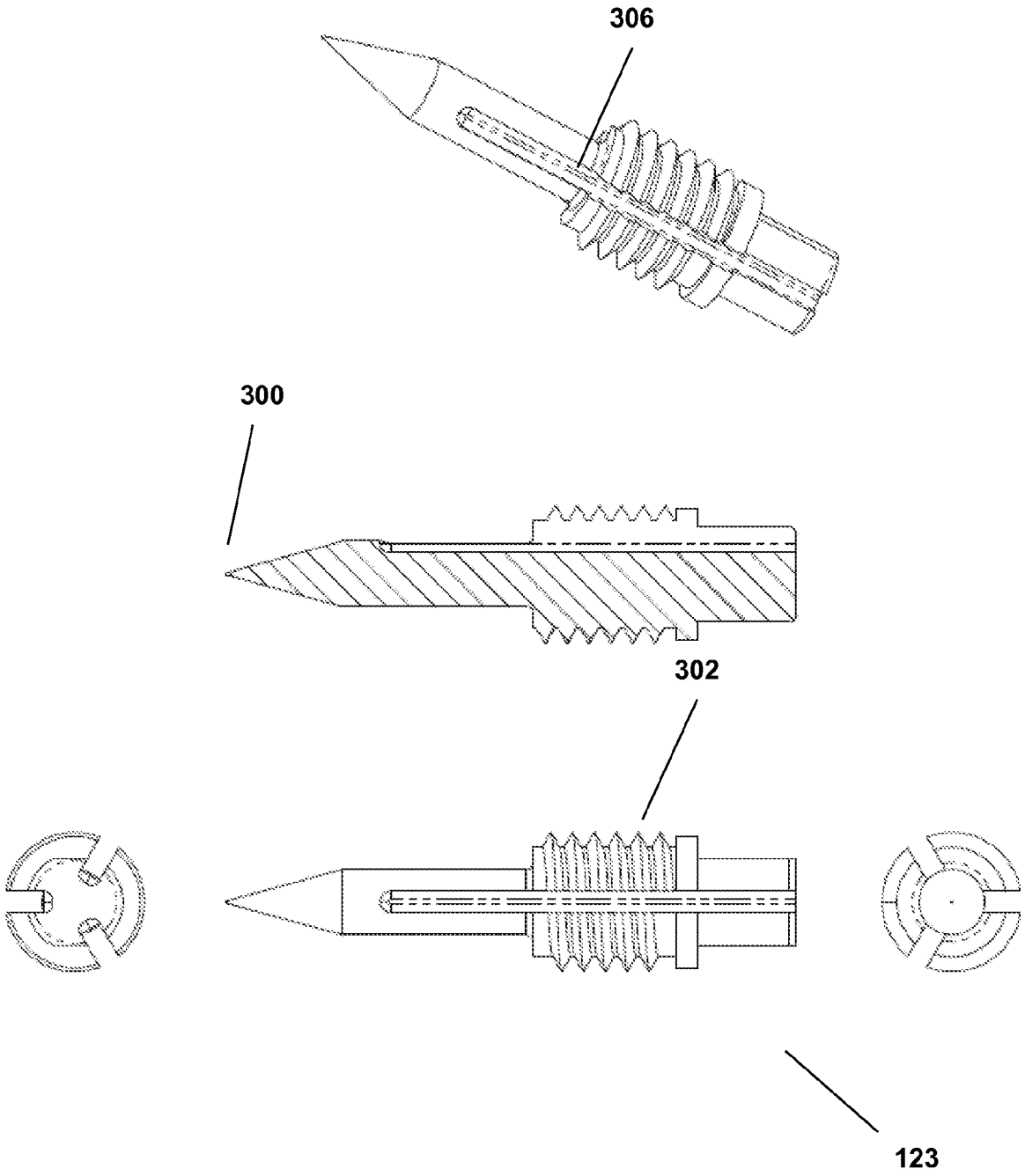



Figure 44

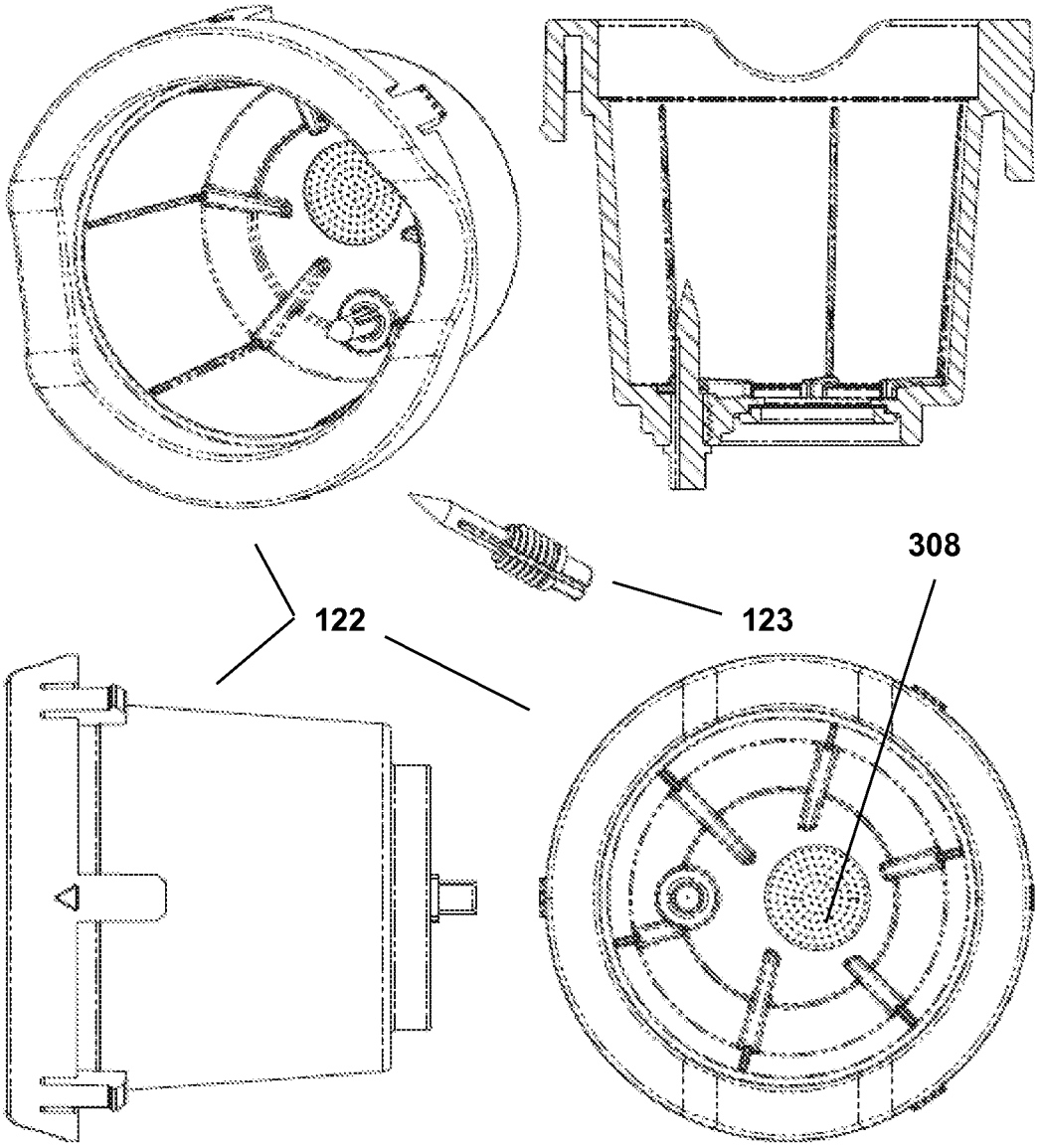
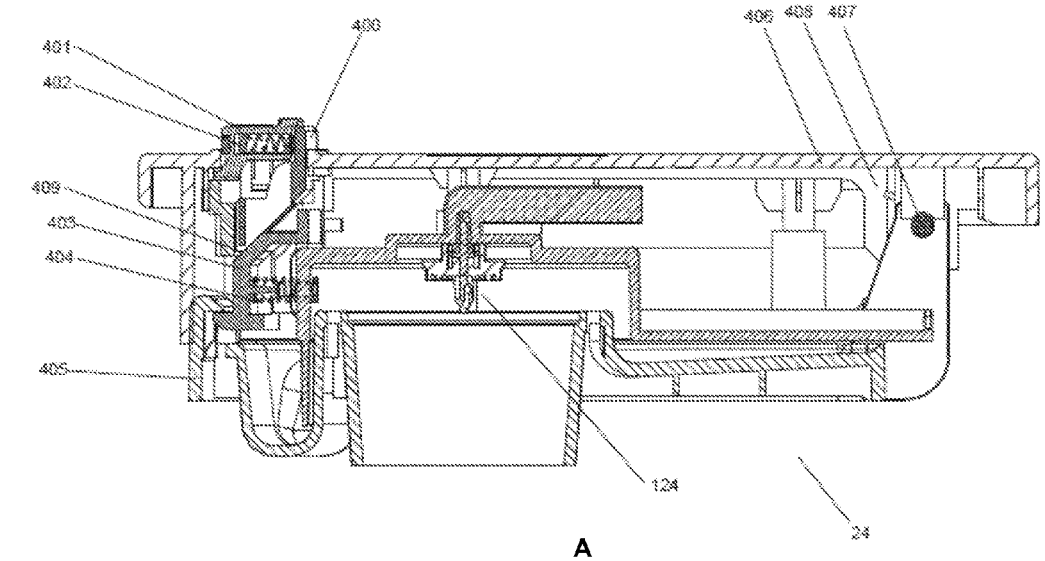
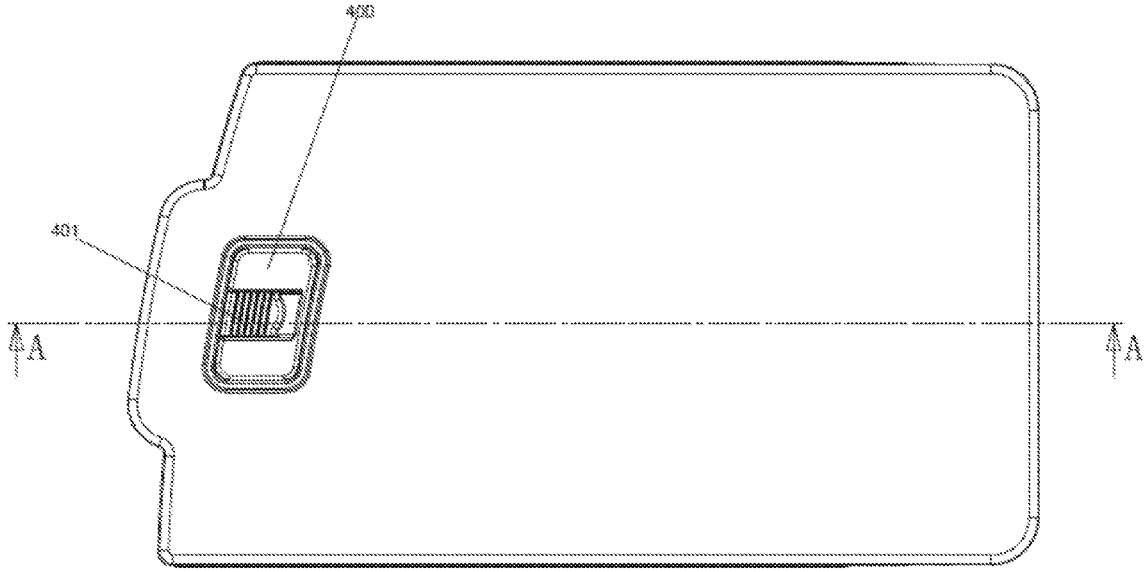



Figure 45




A




B

Figure 46

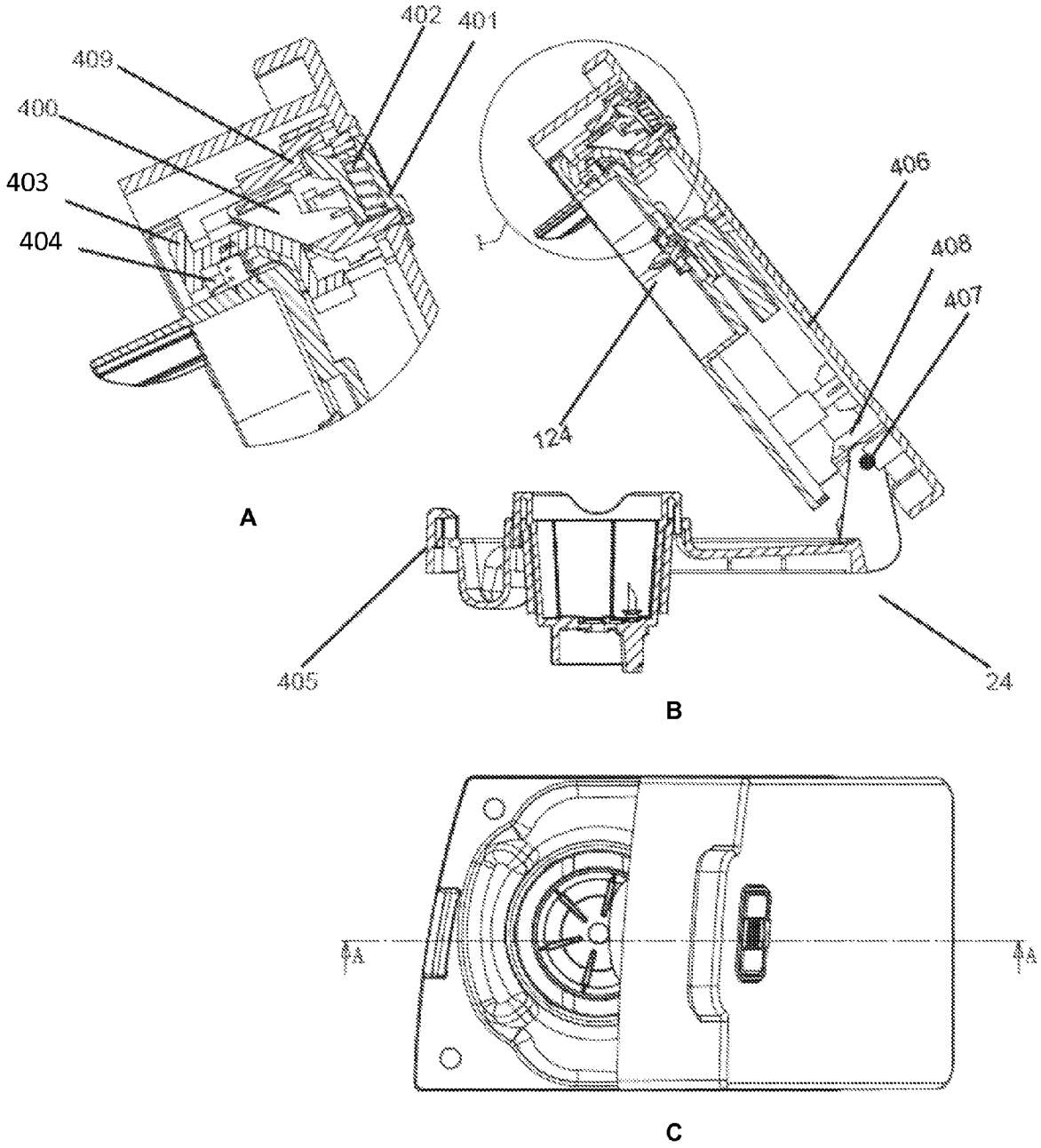
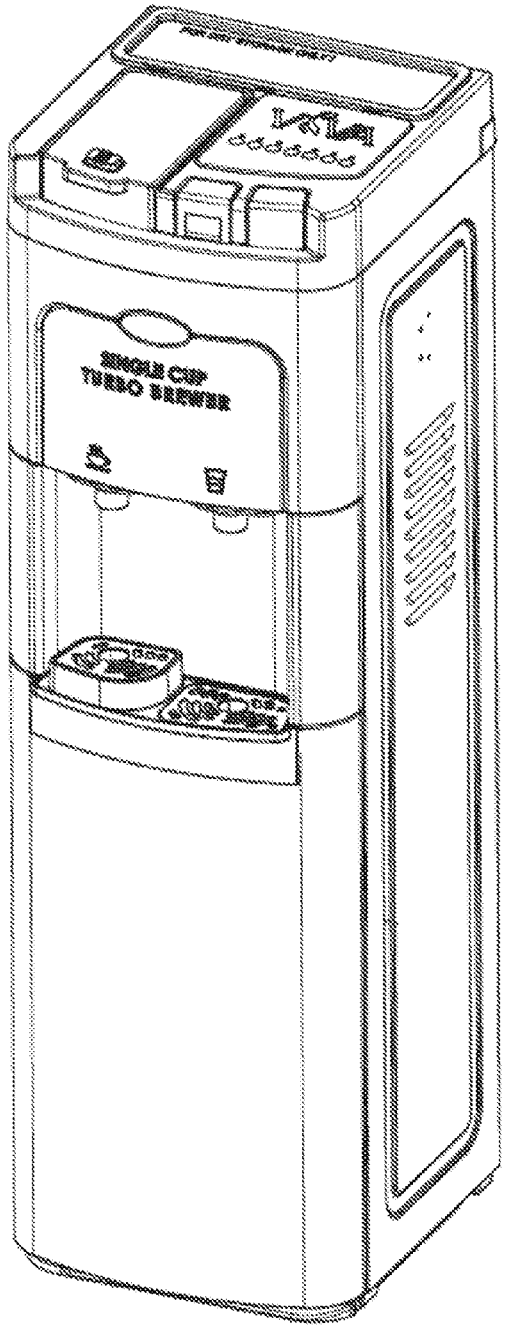
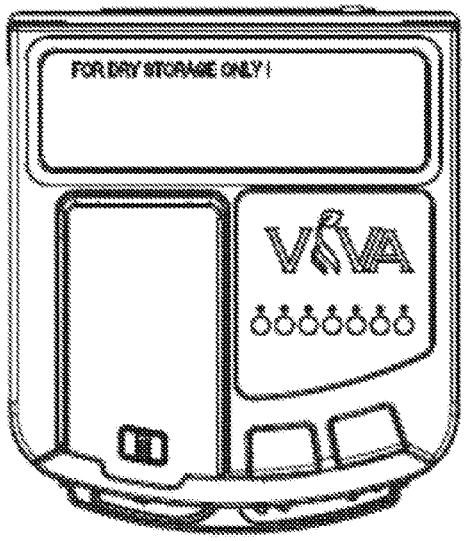



Figure 47



A




B

Figure 48

# BOTTLED WATER DISPENSERS WITH SINGLE-SERVE COFFEE BREWING FEATURES

## CROSS-REFERENCE TO RELATED APPLICATIONS

This is a continuation-in-part application of U.S. patent application Ser. No. 13/751,996, filed on Jan. 28, 2013.

## FIELD OF THE INVENTION

The present invention relates generally to the field of bottled water dispensers and coffee brewing devices and, more particularly, to combination devices that include bottled water dispensing features and coffee brewing devices.

## BACKGROUND OF THE INVENTION

The demand for clean and healthy drinking water is increasing dramatically, which is being driven by the rapid growth in population and standards of living across the globe. This demand has translated into a continuing need for safe, clean, and easy to use water dispensers, including for both hot and cold water. In addition, both residential homes and commercial offices will typically have at least one coffee brewing device. Indeed, coffee is among the most frequently-consumed beverages in the world. Since bottled water dispensers often include a source of clean and consumable drinking water, it would be advantageous to combine and integrate the features and functionalities of bottled water dispensers, including for both hot and cold water, and coffee brewing devices (and, particularly, single-serve coffee brewing devices). Furthermore, it would be desirable to provide a product, which combines hot/cold water dispensing features and coffee brewing devices, and is able to produce a single-serve coffee beverage quickly and with consistent quality.

As the following will demonstrate, many of the foregoing needs are addressed by the present invention.

## SUMMARY OF THE INVENTION

According to certain aspects of the invention, a combined bottom-loading bottled water dispenser and coffee making device is provided, which includes an exterior cabinet; an interior space that is configured to house a water bottle within the bottom half of the dispenser; a cold water tank and means for dispensing cold water from such tank; a first hot water tank and means for dispensing water from such tank; and a second hot water tank that is configured to deliver hot water to a coffee making device (with the second hot water tank being configured to receive water from the first hot water tank). The water dispenser further includes one or more flow sensors, which monitor the flow of water into, and volumes of water contained within, the cold and hot water tanks described herein. The invention provides that the coffee making device is integrated into the water dispenser and, preferably, is a single-serve coffee making device. In certain embodiments, the second hot water tank will be configured to be smaller in size (based on its volume), relative to the first hot water tank. The water dispenser will include a hot water pump, which causes hot water to travel from the first hot water tank to the second hot water tank, to back-fill water that leaves the second hot water tank as coffee is made by a user. In certain alternative embodiments, the invention provides that the bottled water dispenser includes a single hot water tank, which is configured to hold water that a user may dispense as desired—and is further configured to supply hot water to the coffee making device.



According to such aspects of the invention, when the water dispenser includes two separate hot tanks, the water that will eventually be used to make coffee may be held at a sufficiently high temperature, e.g., about 92-96 degrees Celsius, within the second hot water tank. The invention provides that replacement water that enters the second hot water tank, from the first hot water tank, may quickly be heated to the desirable coffee-making temperature, e.g., about 92-96 degrees Celsius, since the starting temperature will already be elevated from being held in the first hot water tank. This design also reduces the "waiting time" that is often associated with prior art coffee makers, since the water in the second hot tank is held at a temperature that may be effectively and immediately used to produce coffee. Alternatively, when the water dispenser of the present invention comprises a single hot water tank, the hot water tank will be configured to receive water from the cold tank, and then quickly heat the water to a temperature that is suitable for use in producing a coffee beverage as described herein.

According to additional aspects of the invention, the combined bottom-loading bottled water dispenser and coffee making device may employ the use of an air storage tank, which is configured to receive, store, and release a defined volume of air (through an air tube and into the coffee making device), in order to expel residual water contained within the coffee making device after a coffee beverage is produced. In addition, according to yet further aspects of the invention, the combined bottom-loading bottled water dispenser and coffee making device may utilize certain spikes that are configured to create water entry and coffee beverage exit apertures in a disposable cartridge that houses the coffee grinds that are used to produce a coffee beverage. In such cases, the spike that is configured to create the coffee beverage exit aperture may include one or more apertures and/or cut-out regions through which the coffee beverage flows into a surrounding basket that holds the disposable cartridge, whereupon the coffee beverage may then exit the basket through a separate aperture (to be dispensed for consumption through a dedicated coffee beverage tap).

The above-mentioned and additional features of the present invention are further illustrated in the Detailed Description contained herein.

## BRIEF DESCRIPTION OF THE FIGURES

FIG. **1**: A side interior (cross-sectional) view of a water dispenser described herein, which includes two hot tanks.

FIG. **2**: A diagram that illustrates the arrangement of the two hot tanks, the cold tank, the various solenoids and one-way valves, water pumps, and flow sensors of the water dispenser of FIG. **1**.

FIG. **3**: A side interior (cross-sectional) view of a water dispenser described herein, which includes one hot tank.

FIG. **4**: A diagram that illustrates the arrangement of the hot tank, the air pump, the cold tank, the various solenoids and one-way valves, water pumps, and flow sensors of the water dispenser of FIG. **3**.

FIG. **5**: A side interior (cross-sectional) view of another water dispenser described herein, which includes two hot tanks.

FIG. **6**A: A front interior (cross-sectional) view of the water dispenser of FIG. **5**.

FIG. **6**B: A side view of the lid portion of the water dispenser of FIG. **6**A.

FIG. **7**: A topside view of the water dispenser of FIG. **1**.

FIG. **8**: An illustration of the cold tank that is incorporated into the water dispensers described herein.

FIG. **9**: A diagram that illustrates the arrangement of the two hot tanks, the cold tank, the various solenoids and one-way valves, water pumps, air pump, and flow sensors of the water dispenser of FIG. **5**.

FIG. **10**: A side interior (cross-sectional) view of another water dispenser described herein, which includes one hot tank.

FIG. **11**A: A front interior (cross-sectional) view of the water dispenser of FIG. **10**.

FIG. **11**B: A side view of the lid portion of the water dispenser of FIG. **11**A.

FIG. **12**: A diagram that illustrates the arrangement of the hot tank, the cold tank, the various solenoid and one-way valves, pumps, and flow sensors of the water dispenser of FIG. **10**.

FIG. **13**A: An illustration of a hot tank that includes a baffle, which can be used in the water dispensers described herein.

FIG. **13**B: Another illustration of the hot tank of FIG. **13**A.

FIG. **13**C: A side cross-sectional view of a ring seal and a clamp, which are holding together the upper and lower portions of the hot water tank.

FIG. **13**D: A bottom perspective view of the hot tank baffle described herein.

FIG. **13**E: An illustration of the interior portion of a hot tank, showing a heating coil, which can be used in the water dispensers described herein.

FIG. **13**F: Another illustration of the hot tank of FIG. **13**E.

FIG. **13**G: A cross-sectional view of the hot water tank, showing the hot water tank baffle described herein.

FIG. **14**: A diagram that illustrates the arrangement of the compressed (expandable) air storage tank described herein, along with the corresponding air pump, solenoid valve, and air tube (in a dispenser having one hot tank), which are configured to deliver a volume of air (at high pressure) to the coffee making device to expel any residual water after a hot beverage is produced.

FIG. **15**: A side interior (cross-sectional) view of a water dispenser having one hot tank of FIG. **14**, which illustrates the arrangement of the compressed (expandable) air storage tank described herein, along with the corresponding air pump, solenoid valve, and air tube.

FIG. **16**: A diagram that illustrates the arrangement of the compressed (expandable) air storage tank described herein, along with the corresponding air pump, solenoid valve, and air tube (in a dispenser having two hot tanks), which are configured to deliver a volume of air (at high pressure) to the coffee making device to expel any residual water after a hot beverage is produced.

FIG. **17**: A side interior (cross-sectional) view of a water dispenser having two hot tanks of FIG. **16**, which illustrates the arrangement of the compressed (expandable) air storage tank described herein, along with the corresponding air pump, solenoid valve, and air tube.

FIG. **18**: A diagram that illustrates the arrangement of the compressed (expandable) air storage tank described herein, along with the corresponding air pump, one-way valve, and air tube (in a dispenser having one hot tank), which are configured to deliver a volume of air (at high pressure) to the coffee making device to expel any residual water after a hot beverage is produced.

FIG. **19**: A side interior (cross-sectional) view of a water dispenser having one hot tank of FIG. **18**, which illustrates the arrangement of the compressed (expandable) air storage tank described herein, along with the corresponding air pump, one-way valve, and air tube.

FIG. **20**: A diagram that illustrates the arrangement of the compressed (expandable) air storage tank described herein, along with the corresponding air pump, one-way valve, and air tube (in a dispenser having two hot tanks), which are configured to deliver a volume of air (at high pressure) to the coffee making device to expel any residual water after a hot beverage is produced.

FIG. **21**: A side interior (cross-sectional) view of a water dispenser having two hot tanks of FIG. **20**, which illustrates the arrangement of the compressed (expandable) air storage tank described herein, along with the corresponding air pump, one-way valve, and air tube.

FIG. **22**: An illustration of the cold tank that is incorporated into the water dispensers described herein.

FIG. **23**A: An illustration of a water dispenser and coffee making device of the present invention.

FIG. **23**B: An illustration of another water dispenser and coffee making device of the present invention, which is taller than the dispenser of FIG. **23**A.

FIG. **24**: A top side view of a bottle tray that is used in the water dispensers described herein.

FIG. **25**: An illustration of a sharp-ended spike of the coffee making device described herein.

FIG. **26**: An illustration of second hot tank described herein.

FIG. **27**: An illustration of the topside of a water dispenser described herein, with the top cover removed, which shows the square-shaped top portion of the cold tank.

FIG. **28**: An illustration of another sharp-ended spike of the coffee making device described herein, which includes a cut-out side that begins at the tip of the spike.

FIG. **29**: An illustration of a basket that receives a coffee cartridge as described herein, which includes the sharp-ended spike of FIG. **28**.

FIG. **30**: An illustration of another sharp-ended spike of the coffee making device described herein, which includes a cut-out side that begins at the tip of the spike (and has a separate aperture on the other side of the spike).

FIG. **31**: An illustration of a basket that receives a coffee cartridge as described herein, which includes the sharp-ended spike of FIG. **30**.

FIG. **32**: An illustration of another sharp-ended spike of the coffee making device described herein, which includes a cut-out side that begins at the tip of the spike (and has a separate cut-out portion on the other side of the spike that begins near the middle and ends at the base of the spike).

FIG. **33**: An illustration of a basket that receives a coffee cartridge as described herein, which includes the sharp-ended spike of FIG. **32**.

FIG. **34**: An illustration of another sharp-ended spike of the coffee making device described herein, which includes a cut-out side that begins at the tip of the spike and ends at the base of the spike.

FIG. **35**: An illustration of a basket that receives a coffee cartridge as described herein, which includes the sharp-ended spike of FIG. **34**.

FIG. **36**: An illustration of another sharp-ended spike of the coffee making device described herein, which includes a middle area that exhibits a continuously winding protrusion.

FIG. **37**: An illustration of a basket that receives a coffee cartridge as described herein, which includes the sharp-ended spike of FIG. **36**.

FIG. **38**: An illustration of another sharp-ended spike of the coffee making device described herein, which includes a cut-out side that begins short of the tip of the spike and ends at the base of the spike.

FIG. **39**: An illustration of a basket that receives a coffee cartridge as described herein, which includes the sharp-ended spike of FIG. **38**.

FIG. **40**: An illustration of another sharp-ended spike of the coffee making device described herein, which includes an aperture that begins near a threaded portion and ends prior to the tip of the spike.

FIG. **41**: An illustration of a basket that receives a coffee cartridge as described herein, which includes the sharp-ended spike of FIG. **40**.

FIG. **42**: An illustration of another sharp-ended spike of the coffee making device described herein, which comprises a conical tip and includes an aperture that begins near a threaded portion and ends prior to the tip of the spike.

FIG. **43**: An illustration of a basket that receives a coffee cartridge as described herein, which includes the sharp-ended spike of FIG. **42**.

FIG. **44**: An illustration of another sharp-ended spike of the coffee making device described herein, which comprises a conical tip and includes a cut-out side that begins short of the tip of the spike and ends at the base of the spike.

FIG. **45**: An illustration of a basket that receives a coffee cartridge as described herein, which includes the sharp-ended spike of FIG. **44**.

FIG. **46**A: A side cross-sectional view of the lid and child safety feature (latch) described herein.

FIG. **46**B: A top view of the lid and child safety feature (latch) described herein.

FIG. **47**A: A side cross-sectional view of the end portion of the lid and the child safety feature (latch) described herein, after the lid has been opened.

FIG. **47**B: A side cross-sectional view of the lid and the child safety feature (latch) described herein, after the lid has been opened.

FIG. **47**C: A topside view of the lid, in a partially opened position.

FIG. **48**A: A perspective view of a dispenser having the child safety feature (latch) described herein.

FIG. **48**B: A topside view of the lid of the dispenser of FIG. **48**A.

## DETAILED DESCRIPTION OF THE INVENTION

The following will describe in detail several preferred embodiments of the present invention. These embodiments are provided by way of explanation only, and thus, should not unduly restrict the scope of the invention. In fact, those of ordinary skill in the art will appreciate upon reading the present specification and viewing the present drawings that the invention teaches many variations and modifications, and that numerous variations of the invention may be employed, used and made without departing from the scope and spirit of the invention.

According to certain preferred embodiments of the present invention, bottom loading water dispensers are provided **10**. The water dispensers generally comprise a cabinet having an exterior portion **12** and an interior portion **14**, with the interior portion **14** including a top half **16** and a bottom half **18** (FIG. **6**). The bottom loading water dispensers include a water bottle **20** that is disposed in the bottom half **18** of the interior portion **14** of the cabinet (in an upright position). The water dispensers will include a set of (hot **22**A/cold **22**B) water dispensing actuator buttons **22**, which may be operated to dispense both cold water and hot water, as desired (i.e., to cause water to be extracted from the water bottle **20**, travel through a set of interior tubes, through a cold tank (and, for hot water, through a hot tank), and exit through a cold or hot water tap). In addition, the invention provides that the water dispenser will include a fully integrated coffee making device **24**, which will preferably be a single-serve coffee making device. As described further below, the invention provides that the coffee making device **24** will utilize water that is originally housed within the water bottle **20**, and transferred to a set of two hot water tanks (described below), prior to being used to produce coffee by the coffee making device **24**. In certain alternative embodiments, the water that is originally housed within the water bottle **20** may be transferred to a single hot water tank (e.g., FIGS. **3**, **4**, **10-12**, **14**, **15**, **18**, and **19**), prior to being used to produce coffee by the coffee making device **24**.

More specifically, in certain preferred embodiments (as shown in FIGS. **1**, **2**, **5**, **6**, **9**, **16**, **17**, **20**, and **21**), the water dispensers of the present invention may comprise a first hot tank **28**, a second hot tank **26** (positioned above the first hot tank **28**), a cold tank **30**, a flow meter **36** (configured to monitor the volume of water that flows from the first hot tank **28** to the second hot tank **26**), a one-way valve **33** (configured to allow water to leave the second hot tank **26** and enter the coffee making device **24** and further designed to prevent brewed coffee from leaving the coffee making device **24** and flowing back into the hot tank **26** due to the pressure created in the coffee making device **24**), a first pump **32** (configured to cause water to move from the first hot tank **28** to the second hot tank **26**), an optional solenoid valve **38** (which is normally closed and in-line between the first hot tank **28** to the second hot tank **26**), a compressor **40** (for the cooling system of the cold tank **30**), a second pump **42** (configured to cause water to move from the water bottle **20** to the cold tank **30**), a water bottle **20**, and a coffee making device **24**.

According to such embodiments, the invention provides that the coffee making device **24** employs the use of the dual hot tank design described herein, in order to ensure that optimal water temperatures can be quickly achieved when brewing coffee with the device. More particularly, the invention provides that water in the water bottle **20** will enter the cold tank **30** of the water dispenser, via a force provided by the second pump **42**. The water that is held within the cold tank **30** may then travel through a connecting tube, via hydrostatic forces and a cold water outlet, into the first hot tank **28**. In the first hot tank **28**, the water is heated, e.g., via a set of electric heating coils **64** (FIG. **13**E/**13**F), to a final temperature that ranges between 50 and 98 degrees Celsius, and preferably between 85 and 96 degrees Celsius. The invention provides that the heating coils **64** may reside within, or outside of and directly adjacent to, the hot tanks described herein. The steam that is created within the first hot tank **28** will be allowed to re-circulate and travel back to the cold tank **30** via one or more outlet (vapor) tubes **60** (FIG. **2**). In addition, the invention provides that the first hot tank **28** is operably connected with a hot water outlet **54**, through which hot water may be dispensed from and exit the dispenser (by a user operating the hot water actuator button **22**A to cause water to flow from the hot water tap), e.g., if a user wants to access hot water to make, for example, a hot tea or hot chocolate beverage.

According to such embodiments, the hot water that is contained within the first hot water tank **28** may also flow into the second hot water tank **26**, which supplies water to the coffee making device **24**, via an optional solenoid (or one-way) valve **38**, a first flow sensor **36**, and a first pump **32**. The optional solenoid (or one-way) valve **38** is preferably closed,

unless water is traveling from the first hot water tank **28** to the second hot water tank **26**. In the second hot water tank **26**, the water is heated, e.g., via a set of electric heating coils, to a final temperature that preferably ranges between 93 and 96 degrees Celsius.

The invention provides that the steam and excess hot water (created due to expansion from the water heating process) that is generated within the second hot water tank **26** may be diverted back to the cold tank **30** through a separate outlet (vapor) tube **62** and solenoid valve **9**. The invention provides that the one-way solenoid valve **9** is typically open, unless water is being diverted to the coffee making device **24**. The invention provides that the solenoid valve **9** will preferably be open, in order to allow steam that is generated within the second hot water tank **26** to be diverted back to the cold tank **30** at all times (through the outlet tube **62** and solenoid valve **9**), unless water is being transferred from the second hot water tank **26** to the coffee making device **24** via a dedicated tube **63**, which includes a one-way spring-loaded valve **33**. The one-way spring-loaded valve **33** is normally closed due to a light force provided by the spring, such that steam and vapors do not drip into the coffee making device **24**, but will be caused to open by water pressure, when water is transferred from the second hot water tank **26** to the coffee making device **24** (with the water pressure being provided by the pump **32**).

The invention provides that the user controls of the water dispenser (FIG. **7**) may be operated to cause hot water to travel from the second hot water tank **26** and into the coffee making device **24**. Within the coffee making device **24**, the hot water makes contact with an appropriate volume of coffee grinds, which melts the coffee grinds to create the desired coffee beverage. In such embodiments, the coffee grinds may reside in a plastic, disposable cartridge, whereby the coffee making device **24** is configured to make a hot water entry aperture and hot water exit aperture in the cartridge (which may be comprised of tin foil, plastics, or combinations thereof), such that the hot water may enter the cartridge, contact the coffee grinds, dissolve the coffee grinds to produce a coffee beverage, and then be expelled from the cartridge through the exit aperture, such that the coffee beverage may be dispensed via a dedicated coffee outlet **56** (and coffee tap).

More particularly, the invention provides that the coffee making device **24** may comprise two hollow spikes, which are configured to create the hot water entry and hot water (coffee beverage) exit apertures. Preferably, a first spike **124** (FIGS. **6**, **11**, and **25**) will comprise a blunt end (located within a lid portion of the dispenser), which will be configured to pierce the top of the coffee cartridge to create the hot water entry aperture. The second spike **123** (FIGS. **28-45**) will be located in a basket **122**, which is configured to receive the coffee cartridge in the coffee making device **24**. The second spike **123** will be configured to exhibit a sharp end, and to be capable of piercing the bottom of the cartridge to create the exit aperture.

The invention provides that the first spike **124** is hollow, and is coupled to a line that delivers water to the coffee making device **24** (from a hot tank). As shown in FIGS. **28-45**, the second spike **123** may exhibit a variety of configurations. In certain embodiments, the second spike **123** may comprise one or more apertures (e.g., FIG. **42**), or simply exhibit a curved piece of material with a side (or contiguous area) that is removed or cut-out (e.g., FIGS. **28**, **32**, **34**, **36**, **38**, **40**, and **44**), through which coffee beverage may exit and enter the surrounding basket **122**. More specifically, the second spike **123** may comprise a sharp end **300**; a threaded end (or a roughed end) **302** opposite of the sharp end **300**; and a middle portion between the sharp end **300** and threaded end **302** that comprises (1) one or more apertures **304** (e.g., FIG. **42**); (2) a curved material having a cut-out region **306** between a beginning and ending side of the curved material (e.g., FIGS. **28**, **32**, **34**, **36**, **38**, **40**, and **44**); or (3) a combination of one or more apertures **304** and a cut-out region **306** (e.g., FIG. **30**). The invention provides that the threaded ends **302** of the spikes **124**,**123** will be configured to help bond and connect the spikes **124**,**123** to the injected plastic housings into which the spikes **124**,**123** are positioned and attached. The invention provides that the second spike **123**, after creating the exit aperture in the coffee cartridge, will be configured to cause the brewed coffee beverage to exit the coffee cartridge through (1) the one or more apertures **304** and/or cut-out regions **306**; (2) through the exit aperture in the cartridge itself; or (3) combinations of (1) and (2), such that the coffee beverage then flows into the surrounding basket **122**.

The invention provides that the basket **122** will preferably include an aperture **126** through which the coffee beverage may then exit the basket **122**, which is coupled to a line that removes coffee beverage from coffee making device **24**, and allows such coffee beverage to exit through the coffee outlet **56** (and coffee tap). The invention provides that, in certain embodiments, a filter **308** may be disposed within, near, or on top of the aperture **126** (e.g., FIGS. **33**, **35**, **39**, and **45**), which serves to retain coffee grinds within the basket **122** and prevent such grinds from exiting the coffee making device **24** and coffee outlet **56**.

The invention provides that the coffee making device **24** will preferably comprise a self-locking lid, which may be opened (and closed) at the top side of the cabinet of the water dispenser, such that the disposable cartridges (which contain the ground coffee ingredients) may be inserted into and removed from the basket **122** of the coffee making device **24** as needed. The invention provides that the self-locking lid may be opened (about an axis located at one side of the lid); a disposable cartridge may be placed into the basket **122** of the coffee making device **24**; and the lid may then be closed, which causes the first spike **124** to pierce the top of the coffee cartridge and, subsequent to the top of the cartridge being pierced, the second spike **123** will pierce the bottom of the cartridge. According to certain preferred embodiments, the first spike **124** (which preferably exhibits a blunt end) will be recessed within (or, alternatively, flush with) a surrounding "safety" wall **125** (FIGS. **1**, **3**, **5**, and **6**). The invention provides that the surrounding wall **125** will prevent a user from inadvertently making contact with the spike **124** and potentially injuring his/her hand. In addition to the safety feature provided by the wall **125**, the invention provides that the blunt-ended shape of the spike **124** further mitigates the chance for user injury.

Referring now to FIGS. **46-48**, according to certain embodiments, the lid portion **406** of the coffee making device **24** may comprise a child safety feature, which is configured to prevent a child from opening the lid **406**, while hot water is being delivered to the coffee making device **24**. More specifically, the child safety feature may comprise a slide **401**, which a user may push forward and towards the backside of the dispenser. The slide **401** will be subject to a constant bias force imparted by a spring **402**, which exerts a force on the slide **401** towards the front of the dispenser. When the slide **401** is pushed forward, a connected piece beneath the top surface of the slide **401** is moved away from a lock stop **409**. After the slide **401** is pushed forward, a button **400** (in which the slide **401** resides) may be depressed downwards. The invention provides that when the button **400** is depressed downwards, a connected tapered portion of the button **400**

(which resides within the lid **406**) will push another internal slide **403** towards the rear of the dispenser, which causes the internal slide **403** to disengage from a lock tab **405**. When the button **400** is not depressed, the internal slide **403** and lock tab **405** are engaged (e.g., FIG. **46**A), with the internal slide **403** being subject to a constant bias force exerted by a spring **404** towards the lock tab **405**, such that the lock tab **405** mechanically prevents the lid **406** from opening. When the button **400** is depressed, and the internal slide **403** and lock tab **405** are disengaged (e.g., FIG. **47**B), the lock tab **405** no longer prevents the lid **406** from opening. As such, upon release of the pressure from slide **401** and push button **400**, the lid **406** will open via a force exerted by another spring **408** and will rotate around the hinge pin **407**. Accordingly, as described above, the child safety feature requires a user to impart two different, yet simultaneous, forces on the slide **401** (force exerted towards the back of the dispenser) and button **400** (force exerted downwards from lid **406**), in order to open the lid **406** (which is effective to prevent young children from inadvertently opening the lid **406**).

The invention provides that a user may instruct the water dispenser to produce a serving of coffee, through a main control board **58** located on the exterior cabinet of the water dispenser (e.g., on the top side of the exterior cabinet). The main control board **58** will issue a signal to activate a control solenoid valve **38**, whereupon hot water that is contained within the first hot water tank **28** travels into the second hot water tank **26** (with the force being provided by the pump **32**), with the first flow sensor **36** controlling and monitoring water capacity of the second hot water tank **26**. When the second hot water tank **28** reaches full capacity, the control solenoid valve **38** and pump **32** stop working. As water is being pumped from the first hot tank **28** and into the second hot tank **26**, hot water from the second hot tank **26** will be forced into the coffee making device **24** via tube **63**. The one-way valve **33** will be opened from its normally closed position by the force of the water. As described above, the hot water will travel through tube **63**, through one or more apertures located near the tip of the first spike **124**, and into the coffee cartridge (where the hot water makes contact with the coffee grinds for a defined and sufficient period of time, before the resulting coffee beverage is extracted from the coffee making device **24** (basket **122**) and exits through the aperture **126** and connected line that is coupled to the coffee outlet **56** and external coffee tap). The invention provides that the produced coffee beverage may exit the basket **122** and coffee outlet **56** through a force provided by a separate pump, through a gravity force (i.e., the coffee beverage being drained through the coffee outlet **56**), and/or via the air forced imparted by the air storage tank **202** (described below).

After the coffee beverage is produced, the second hot tank **26** remains full with water, which is heated within the second hot water tank **26** to a pre-defined temperature, e.g., 96-degrees Celsius, at which point the second hot water tank **26** operates to maintain the water at such temperature. This process minimizes the time that is required to produce a coffee beverage (since the water in the second hot water tank **26** is at the necessary brewing temperature). In addition, this process mitigates the cooling effect of the cold water that is provided to the hot tanks from the cold tank **30**, since the cold water is first transferred to the first hot tank **28** and heated, before it is later transferred to the second hot tank **26**.

Still further, the invention provides that a user of the water dispenser may operate the main control board **58** to instruct the dispenser to produce a single-serving of coffee and, in so doing, may specify the volume of the serving among two or more options (e.g., a "big cup" or "small cup"). Upon issuing such instructions via the main control board **58**, the control solenoid valve **38** and pump **32** are activated, whereupon a defined amount of hot water that is contained within the first hot water tank **26** is forced into the second hot water tank **26**. In turn, a proportionate amount of hot water that is contained in the second hot water tank **26** is forced (under pressure) into the coffee making device **24**, where such water makes contact with coffee grinds as described above, which produces the desired coffee beverage that may be dispensed via a dedicated coffee outlet **56**. The invention provides that the first flow sensor **36** controls water capacity in the second hot tank **26**, such that upon a user selecting the "big cup" or "small cup" option, the flow sensor **36** will issue a signal when the flow of water has reached the pre-defined water flow that is correlated with the selected "big cup" or "small cup" setting. Upon the flow sensor **36** issuing such a signal, the main control board **58** issues an instruction to deactivate the control solenoid valve **38** and pump **32**, in order to stop the pumping and transfer of water from the first hot water tank **28** into the second hot water tank **26**.

According to certain embodiments of the invention, in addition to the flow sensors described herein (or as an alternative to such flow sensors), a set of electrodes may optionally be used to monitor and determine when the water levels in the cold tank **30** and hot tanks **26**,**28** have reached full capacity. For example, when sufficient water is present in such tanks, a pair of electrodes (near the top of such tanks) will be immersed in water, such that an electrical current is allowed to flow between such electrodes. The electrical flow is communicated to the control board **58**, which issues a deactivation signal to the pumps. For example, when an electrical signal is detected by electrodes **72** (FIG. **22**) in the cold tank **30**, the control board **58** may instruct the pump **42** not to operate; whereas, if an electrical signal is not detected by electrodes **72** in the cold tank **30** (and the water line resides below such electrodes), the control board **58** may instruct the pump **42** to activate and transfer water from the water bottle **20** to the cold tank **30**, until such time that an electrical signal is detected by electrodes **72**.

Similarly, for example, when an electrical signal is detected by electrodes located near the top of the second hot tank **26**, the control board **58** may instruct the pump **32** not to operate; whereas, if an electrical signal is not detected by such electrodes in the second hot tank **26** (and the water line resides below such electrodes), the control board **58** may instruct the pump **32** to activate and transfer water from the first hot tank **28** to the second hot tank **26**. This flow of water may further cause water to be hydrostatically transferred (back-filled) from the cold tank **30** and into the first hot tank **28**, since the cold tank **30** will be positioned higher than the first hot tank **28** (with the water that is extracted from the cold tank **30** being replaced with water that is extracted from the water bottle **20**). The vent tube **60** permits steam and air to leave the hot tank **28**, which also facilitates the hydrostatic transfer of water from the cold tank **30** into the first hot tank **28**. Alternatively, as described herein, the current water volumes of the cold tank **30** and hot tanks **26**,**28** described herein may be monitored and calculated via in-line flow sensors. Referring to FIG. **22**, the cold tank **30** may further comprise a buoyant cold water baffle **70**, which rises and falls along with the water level within the cold tank **30**. The position of the buoyant cold water baffle **70** may be monitored by the control board of the dispenser, thereby providing an alternative (or additional) means for tracking the volume of water contained in the cold tank **30**. Still further, the invention further provides that a

mechanical float valve **128** may, optionally, be employed to serve as a back-up water volume control for the cold water tank **30**.

According to still further embodiments, and referring to FIG. **22**, the invention provides that the cold tank **30** will preferably exhibit an approximately rectangular shape, i.e., the perimeter of the cold tank **30** exhibits a substantially rectangular perimeter and cross-section (unlike most cold tanks used in prior art water dispensers, which are typically cylindrical in shape). This configuration is also shown in FIG. **27**. The invention provides that the approximately rectangular shaped cold tank **30** saves needed space within the interior **14** of the dispenser. The invention further encompasses the use of other space-saving and non-cylindrically, irregularly-shaped cold tanks **30**. Still further, the cold tank **30** will preferably comprise an internal cooling evaporator **74** (instead of an externally placed evaporator as in many prior art cooling tanks). The invention provides that the internal cooling evaporator **74** will house the coolants that are used to chill the water that is contained within the cold tank **30**. More particularly, the evaporator **74** will be comprised of stainless steel and copper or aluminum laminated material, with the exterior surface of the evaporator **74** (which contacts the water in the cold tank **30**) being comprised of stainless steel. Still further, the invention provides that the body of the cold tank **30** will preferably be comprised of a food grade material, such as polypropylene material.

FIG. **26** provides an illustration of the second hot tank **26** described herein. According to certain embodiments, the second hot tank **26** may hold about 600 mL of water—and may be provided with up to about 1500 watts to heat the water contained therein. The invention provides that the second hot tank **26** may have a lower half **138** and an upper half **135**, and comprise an intake water pipe **139** (which receives water from the first hot tank **26**); an external heating element **141**; a safety cover **140**; a thermostat well **136** for an electronic temperature sensor/thermostat; an O-ring seal **133**; a clamp **137**; electronic sensors **134** for monitoring whether the hot tank **26** is full (as described herein); a vent/steam return line **131** (configured to return air and steam back to the cold tank **30**); and a water-exit port **132** that is used to deliver water to the coffee making device **24**. The invention provides that the hot tank **26** may alternatively be welded together without a clamp **137** and, furthermore, may include a mechanical thermostat (instead of an electronic thermostat). In addition, as explained herein in relation to certain alternative embodiments, the hot tank **26** may comprise an internal heating element (in replacement of or in addition to the external heating element **141**).

Referring now to FIGS. **3**, **4**, **10-12**, **14**, **15**, **18**, and **19**, in certain additional embodiments, the invention provides that the water dispensers of the present invention may comprise only a single hot tank **80**. The water dispensers in such embodiments will be similar to those described above, with the exception that the dispensers will include one hot tank **80** instead of two separate tanks **26**,**28**. According to such embodiments, the single hot tank **80** will receive water from the cold tank **30**. The water line between the cold tank **30** and hot tank **80** will include a flow meter **43**A and water pump **43**B. The invention provides that when cold water is pumped from the cold tank **30** into the hot tank **80**, the one-way valve **43** will prevent such water from back-flowing into the cold tank **30**. In addition, the one-way valve **43** will close upon receiving a signal that water is being transferred from the hot tank **80** to the coffee making device **24** (in certain alternative embodiments, the one-way valve **43** may be a solenoid valve).

According to such embodiments, the water line between the hot tank **80** and the coffee making device **24** may also include a one-way spring-loaded valve **33**, which may exist in a "closed" position, unless a user instructs the dispenser to produce a cup of coffee as described herein, in which case the water pressure (provided by the water pump **43**B) will cause the one-way spring-loaded valve **33** to open and allow a defined volume of water to be transferred from the hot tank **80** and into the coffee making device **24** (although a one-way spring-loaded valve **33** may be employed as described, the invention provides that a solenoid valve may also be used). Still further, as in the other embodiments described herein, the water dispenser will include a pump **43**B, which is configured to pump water from the cold tank **30** and into the hot tank **80**, with a flow meter **43**A located in such water line between the cold tank **30** and hot tank **80**, with the flow meter being configured to monitor and restrict the volume of water that is transferred from the cold tank **30** and into the hot tank **80**, to the volume of water that corresponds to, and is needed to produce, the desired volume of coffee beverage.

Referring to FIG. **13**A-**13**G, the hot tank **80** may comprise one or more internally mounted thermostats **90** that are configured to monitor the temperature of the water contained therein, and communicate such information to the control board **58** (in certain alternative embodiments, the thermostats **90** may be externally mounted). In the hot tank **80**, the water is heated within a reasonable amount of time, e.g., via a set of electric heating coils **64** (which may be embedded within, connected to, or brazed to a side of the hot tank **80**) to a final temperature that preferably ranges between 93 and 96 degrees Celsius.

The invention provides that the hot tank **80** may comprise a baffle **92**, which separates the interior portion of the hot tank into two separate chambers **94**,**96**. The baffle **92** will be configured to allow water to travel from one chamber **96** to another **94**, albeit slowly and gradually. The baffle **92** is configured to be located between (1) the side that is closest to the heating coils **64** and (2) the side that comprises the cold water intake area (i.e., the port **102** through which water enters the hot tank **80** from the cold tank **30**). This way, the baffle **92** serves as a type of barrier between the recently injected cold water, and existing hot water, and allows the two chambers of water to gradually be mixed and heated to equilibrium. In addition, the baffle **92** is configured to minimize the mixing of hot/cold water, while the injected cold water is displacing the hot water that is being transferred to the coffee making device **24**. The invention provides that the baffle **92** may exhibit a concave shape, which exhibits a perimeter that is configured to reside adjacent to the interior surface of the hot tank **80** (and may include a set of tabs **106** that are configured to mechanically position and hold the baffle **92** within the hot tank **80**). The invention provides that the baffle **92** may comprise one or more apertures **109** through which water may move from one chamber **96** to another **94** of the hot tank **80** (FIG. **13**G).

The invention provides that the dispensers may be configured to deliver to the water heating coils **64** (through a wattage regulator), a moderate wattage, e.g., 425-500 watts, for maintaining the water contained in the hot tank **80** at a relatively constant temperature (during periods of non-use). This moderate usage of energy will not only conserve energy, it will also avoid unwanted "kettle noise" within the hot tank. In addition, a user may select—through the control board **58**—a preheat option that will instruct the heating coils **64** to activate a full wattage program (e.g., totaling 1200 watts, and up to 1500 watts), which may be employed to expedite the heating of water contained in the hot tank **80** for the purpose of making a coffee beverage (or dispensing hot water from the external tap).

Still further, the water dispensers of the present invention may comprise a power-saving "sleep option." More particularly, the control board **58** may include an interface that allows a user to specify a regular daily period of time during which the dispenser is not often used, referred to herein as the "sleep time" or "down time" (e.g., during the late night hours when most people are sleeping and not using the dispenser). During the defined "sleep time" periods, the preferred temperature(s) of the hot tank(s) described herein may drop, which will thereby save and preserve the amount of energy that is necessary to maintain the water at the "normal" elevated temperatures. For example, in the case of a single hot tank **80** embodiment, during the "sleep time," the preferred and maintained temperature of the water may drop to about 60-75 degrees Celsius (and preferably consume a moderate amount of energy). In the event that a user attempts to dispense hot water during the "sleep time" (or activates a preheat function on the coffee making device **24**), a heating boost function may be deployed, whereby the heating coils activate and are provided with additional wattage to quickly hear the water to a preferred range of 93 and 96 degrees Celsius.

In the case of a dual hot tank **26**,**28** embodiment, during the normal/operational time periods, the wattage provided to the first hot tank **28** may range between 400-600 watts, and the wattage provided to the second hot tank **26** may have a connected load up to 1100 watts (so long as the total wattage, between the first and second hot tanks **26**,**28**, does not exceed 1500 watts). During the "sleep time," the second hot tank **26** may be completely disconnected or, alternatively, provided with a cyclical amount of wattage (e.g., bursts of 4-60 watts every second or fraction thereof) to maintain the temperature of the water contained therein within a defined range—albeit within a range that is the same as, or cooler than, the temperature of the water during normal operational time periods. As mentioned above, in certain alternative embodiments, the heating coils for one or both of the two hot tanks **26**,**28** may be deactivated entirely during the "sleep time." Still further, in certain additional embodiments, the invention provides that the power-saving "sleep option" may be used to entirely deactivate the entire dispenser (i.e., all functions) during a defined period of time, i.e., remove all power provided to the cold tank and hot tank(s).

Referring to the embodiment above, whereby a hot tank may power-down during "sleep time" by receiving cyclical amounts of wattage, the invention provides that the magnitude and frequency of the wattage bursts may be adjusted in real time. For example, if the temperature of the water within a hot tank falls below a defined range, the frequency (and/or magnitude) of the supplied wattage may be increased (to heat the water); if the temperature of the water within the hot tank elevates above the defined range, the frequency (and/or magnitude) of the supplied wattage may be decreased (to allow the water to cool); and if the temperature of the water within the hot tank falls within the defined range, the frequency (and/or magnitude) of the supplied wattage will be maintained.

As mentioned above, the water dispensers of the present invention include a set of water dispensing actuator buttons **22**. The water dispensing actuator buttons **22** will preferably include at least one child safety latch in at least one of the buttons (the hot water actuator button **22**A). The child safety latch preferably comprises an element that is configured to be moved in a first direction (on the exterior surface of the actuator button **22**), e.g., inward and towards the center of the button, which allows the actuator button to then be pushed downwards to cause hot water to be dispensed. When the child safety latch is released (and the force that moved the element in the first direction is removed), an internal spring will force the element back in a second direction, which prevents the actuator button from being pushed downwards (thereby preventing hot water from being dispensed).

According to still further embodiments, the invention provides that the dispensers may include a system for expelling any residual water that may be left behind in the coffee making device **24** (and/or the disposable cartridge included therein), after a coffee beverage is produced. More particularly, for example, the system may comprise an air pump **200** (FIGS. **9** and **10**) that is configured to deliver a defined volume of air (at sufficient pressure) to expel any residual water that may be left behind in the coffee making device **24** (and/or the disposable cartridge included therein), after a coffee beverage is produced. According to certain embodiments (e.g., FIGS. **14**-**17**), the dispenser may comprise an air pump **200**, compressed air storage tank **202**, and solenoid valve **206**, which are configured to deliver (through an air tube) a high volume of air (at high-pressure) to the coffee making device **24** to expel residual water. The invention provides that the air storage tank **202** may comprise two openings, one for receiving air from the air pump **200** and the other being fluidly coupled to the solenoid valve **206** through the air tube (to allow the air to exist and travel to the coffee making device **24**). Alternatively, both the air inlet and exit openings may be configured to co-exist within the same opening. The invention provides that the air storage tank **202** will preferably comprise a T-connection, with the solenoid valve **206** at one end and the air pump **200** at the other. The invention provides that the control board **58** may be programmed to cause the system to automatically deliver a high-pressure volume of air to the coffee making device **24**, shortly after a hot beverage is produced (with the residual water (and high-pressure air) being forced out of the dispenser through the coffee outlet **56** or other vent).

More particularly, the invention provides that the air pump **200** may be instructed by the control board **58** to generate and fill the compressed air storage tank **202** with a defined volume of air. Immediately or shortly after a hot beverage is produced, the control board **58** will instruct the compressed air storage tank **202** to quickly release all air contained therein, through a solenoid valve **206** and air tube, and into the coffee making device **24** (and disposable cartridge included therein), which will be effective to force any residual water out of the coffee making device **24** (and disposable cartridge included therein), and to exit the dispenser through the coffee outlet **56** or other vent.

The invention provides that the compressed air storage tank **202** may consist of a rigid/fixed tank, with the air therein quickly exiting through the air tube when the solenoid valve **206** is opened. Alternatively, the air storage tank may be configured as an expandable rubber (or other elastomeric) bladder, which is capable of storing a defined volume of air produced by the air pump **200** and may quickly release the air contained therein when the solenoid valve **206** is opened (and the expandable bladder contracts and forces the air out and through the air tube). The invention provides that the air may be retained within the compressed air storage tank **202** (in a high-pressure state) via the solenoid valve **206** being held in a closed position, which may be temporarily opened to allow the air to quickly escape when instructed by the control board **58** to release the air following the production of a hot beverage (i.e., when the air barrier is temporarily removed, the air storage tank **202** will automatically force the air out and through the air tube **204**). The invention provides that the above-described systems for expelling any residual water that may be left behind in the coffee making device **24** may be

employed in both the single hot tank embodiments and dual hot tank embodiments described herein. Still further, the invention provides that the solenoid valve **206** may, alternatively, be replace with a one-way valve **203** (FIGS. **18-21**), which is configured to remain closed in a resting state, but temporarily opened when the control board **58** instructs the air storage tank **202** to release the air following the production of a hot beverage).

Referring now to FIG. **23**, according to further embodiments of the present invention, the water dispensers include a front door **67** that includes a drip tray **69**. The drip tray **69** is preferably built into the front door **67**, such that it is located beneath the external taps (which dispense water and coffee), and is integrally formed into the top portion of the front door **67** of the cabinet. This configuration has been found to increase the amount of room that is available to place a glass (or other container) beneath the external taps when receiving dispensed water or coffee, while simultaneously reducing the total height of the water dispenser (which is beneficial for shipping and retail storage purposes). In addition, the dispensers may comprise a coffee cup platform **68**, which may be varied in height to accommodate different sized cups (and to preferably position the top of the cup in the proximity of the coffee tap). The invention provides that the cabinet of the water dispensers may be comprised of various materials, such as stainless steel, plastics, or other materials.

Referring now to FIG. **24**, according to certain preferred embodiments of the present invention, the dispensers further include a bottle tray **76** disposed at the bottom of the bottom half **18** of the interior portion **14** of the cabinet. The bottle tray **76** is configured to receive the bottom surface of the water bottle **20** in an upright position. Importantly, the bottle tray **76** is slanted from a front side **78**A to a backside **78**B of the tray **76**. That is, when facing the front of the water dispenser, i.e., the side on which the actuator buttons **22** are located, the bottle tray **76** is higher at the front side **78**A thereof than the backside **78**B of the tray **76**. The slope of the slant will preferably range from 5-30 degrees. This configuration facilitates the insertion of a full water bottle **20** into the bottom half **18** of the interior portion **14** of the cabinet (in an upright position). The invention provides that the bottle tray **76** may also comprise a recessed area **82** that is configured to receive a bottom surface of the water bottle **20**. The bottle tray **76** may comprise a perimeter wall **84**, which is configured to prevent the water bottle **20** from falling out of the cabinet, particularly when pressure may be injected into the water bottle to extract water therefrom. According to such embodiments, the bottle tray **76** may comprise a lip **86** that is configured to assist a user with inserting the water bottle **20** onto the bottle tray **76**. Still further, according to certain alternative embodiments, the bottle tray **76** may be slidably pulled out of the cabinet and pushed back into the cabinet, e.g., through a set of wheels, ball bearings, or other sliding mechanisms. According to such embodiments, the bottle tray **76** may be temporarily pulled out from the cabinet to facilitate the placement of a water bottle **20** thereon, and pushed back into the cabinet for storage and subsequent use.

The many aspects and benefits of the invention are apparent from the detailed description, and thus, it is intended for the following claims to cover all such aspects and benefits of the invention, which fall within the scope and spirit of the invention. In addition, because numerous modifications and variations will be obvious and readily occur to those skilled in the art, the claims should not be construed to limit the invention to the exact construction and operation illustrated and described herein. Accordingly, all suitable modifications and equivalents should be understood to fall within the scope of the invention as claimed herein.

What is claimed is:

**1**. A combined water dispenser and coffee making device, which comprises:

(a) a cabinet having an exterior portion and an interior portion, wherein the interior portion of the cabinet is configured to house a water bottle in a bottom half of the interior portion of the cabinet in an upright position;

(b) a cold tank that is configured to receive water from the water bottle, which is connected to an evaporator that is configured to cool the water that is contained within the cold tank;

(c) a hot tank that is configured to receive water from the cold tank, which is connected to a heating coil that is configured to heat the water that is contained within the hot tank;

(d) a coffee making device located on a top side of the cabinet, which comprises a first blunt-ended spike that is configured to puncture a top side of a disposable cartridge that contains coffee grinds for a single-serving of coffee and a second sharp-ended spike that is configured to puncture the bottom side of the cartridge, wherein the coffee making device is further configured to (i) receive water from the hot tank, (ii) receive the disposable cartridge; and (iii) cause water to contact the coffee grinds to produce a coffee beverage;

(e) one or more taps, which are configured to dispense cold water from the cold tank; hot water from the hot tank; and coffee beverage from the coffee making device; and

(f) an air storage tank that is configured to receive, store, and release a defined volume of air through an air tube and into the coffee making device, in order to expel residual water contained within the coffee making device after the coffee beverage is produced.

**2**. The water dispenser and coffee making device of claim **1**, wherein the cold tank exhibits an approximately rectangular perimeter.

**3**. The water dispenser and coffee making device of claim **2**, which further comprises a flow sensor located in-line between the cold tank and hot tank, wherein the flow sensor is configured to monitor a volume of water that flows into the hot tank.

**4**. The water dispenser and coffee making device of claim **2**, which further comprises a drip tray, which is located beneath the cold water tap, hot water tap, and coffee tap, and is integrally formed with a top portion of a front door of the cabinet.

**5**. The water dispenser and coffee making device of claim **2**, which further comprises a bottle tray disposed in the bottom half of the interior portion of the cabinet that is configured to receive a bottom surface of the water bottle in the upright position, wherein the bottle tray is slanted from a front side to a back side of the bottle tray.

**6**. The water dispenser and coffee making device of claim **5**, which further comprises a power-saving program, whereby a user may operate the program through a control board to instruct the dispenser to consume less energy during a defined period of time each day, relative to an amount of energy that the dispenser consumes during all other periods of time during each day.

**7**. The water dispenser and coffee making device of claim **6**, wherein the dispenser consumes less energy during the defined period of time each day by supplying cyclical bursts of wattage to the heating coil.

8. The water dispenser and coffee making device of claim 7, wherein the first blunt-ended spike is recessed within or flush with a surrounding safety wall of a lid of the dispenser.

9. The water dispenser and coffee making device of claim 2, wherein the second sharp-ended spike:

(a) comprises a sharp end; a threaded end opposite of the sharp end; and a middle portion between the sharp end and threaded end that comprises one or more apertures; or

(b) comprises a sharp end; a threaded end opposite of the sharp end; and a middle portion between the sharp end and threaded end that comprises a curved material having a cut-out region between a beginning and ending side of the curved material.

10. The water dispenser and coffee making device of claim 2, which further comprises:

(a) a basket located in the coffee making device that is configured to receive the disposable cartridge, wherein the basket comprises a filter through which coffee beverage exits the basket; and

(b) a lid having a child safety latch, wherein the latch comprises (i) a slide that must be pushed forwards and towards a back of the dispenser and (ii) a button that must be depressed downwards from lid, in order for the lid to open.

11. A combined water dispenser and coffee making device, which comprises:

(a) a cabinet having an exterior portion and an interior portion, wherein the interior portion of the cabinet is configured to house a water bottle in a bottom half of the interior portion of the cabinet in an upright position;

(b) a cold tank that is configured to receive water from the water bottle, which is connected to an evaporator that is configured to cool the water that is contained within the cold tank;

(c) a first hot tank that is configured to receive water from the cold tank, which is connected to a heating coil that is configured to heat the water that is contained within the first hot tank;

(d) a second hot tank that is configured to receive water from the first hot tank, wherein the second hot tank is connected to a heating coil that is configured to heat the water that is contained within the second hot tank;

(e) a coffee making device located on a top side of the cabinet, which is configured to (i) receive water from the second hot tank, (ii) receive a disposable cartridge that contains coffee grinds for a single-serving of coffee; and (iii) cause water to contact the coffee grinds to produce a coffee beverage;

(f) one or more taps, which are configured to dispense cold water from the cold tank; hot water from the first hot tank; and coffee beverage from the coffee making device; and

(g) an air storage tank that is configured to receive, store, and release a defined volume of air through an air tube and into the coffee making device, in order to expel residual water contained within the coffee making device after the coffee beverage is produced.

12. The water dispenser and coffee making device of claim 11, wherein the cold tank exhibits an approximately rectangular perimeter.

13. The water dispenser and coffee making device of claim 12, wherein:

(a) the first hot tank is configured to heat the water contained therein to a temperature that ranges between 50-98 degrees Celsius; and

(b) the second hot tank is configured to heat the water contained therein to a temperature that ranges between 93-96 degrees Celsius.

14. The water dispenser and coffee making device of claim 13, wherein the first hot tank is configured to hold a larger volume of water than the second hot tank.

15. The water dispenser and coffee making device of claim 14, which further comprises a flow sensor located in-line between the first hot tank and second hot tank, wherein the flow sensor is configured to monitor a volume of water that is being displaced in the second hot tank and being transferred to the coffee making device.

16. The water dispenser and coffee making device of claim 15, wherein the second hot tank comprises a set of electrodes, wherein the electrodes are configured to determine whether a volume of water within the second hot tank is above or below a defined threshold volume.

17. The water dispenser and coffee making device of claim 16, which further comprises a drip tray, which is located beneath the cold water tap, hot water tap, and coffee tap, and is integrally formed with a top portion of a front door of the cabinet.

18. The water dispenser and coffee making device of claim 17, which further comprises a bottle tray disposed in the bottom half of the interior portion of the cabinet that is configured to receive a bottom surface of the water bottle in the upright position, wherein the bottle tray is slanted from a front side to a back side of the bottle tray.

19. The water dispenser and coffee making device of claim 18, wherein the set of electrodes are configured such that:

(a) when water is present between such electrodes, an electrical current flows between the electrodes, wherein said electrical flow is detected by a control board, which then signals to a pump that the second hot tank contains a sufficient volume of water, and instructs the pump not to remove water from the first hot tank; and

(b) when water is not present between such electrodes, an electrical current does not flow between the electrodes, wherein an absence of electrical flow is detected by the control board, which then signals to the pump that the second hot tank contains an insufficient volume of water, and instructs the pump to remove water from the first hot tank and to fill the second hot tank until an electrical current is detected by the electrodes.

20. The water dispenser and coffee making device of claim 19, which further comprises a power-saving program, whereby a user may operate the program through the control board to instruct the dispenser to consume less energy during a defined period of time each day, relative to an amount of energy that the dispenser consumes during all other periods of time during each day.

* * * * *